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IMPROVED CANDLE-MOLDER.

The accompaning cuts represent an invention such as we always take pleasure in presenting to our readers; it is novel, and its arrangements are made with that simplicity and directness which generally result from a thorough knowledge of mechanism, and which are always most likely to accomplish the object sought. When we turned from a study of the drawings, in section, and the dim photographs from which the above views were produced, to the beautiful perspectives, with their distinct outlines, drawn by our experienced artist, we were more self-gratified, perhaps, than ever before with our peculiar style of mechanical engraving.

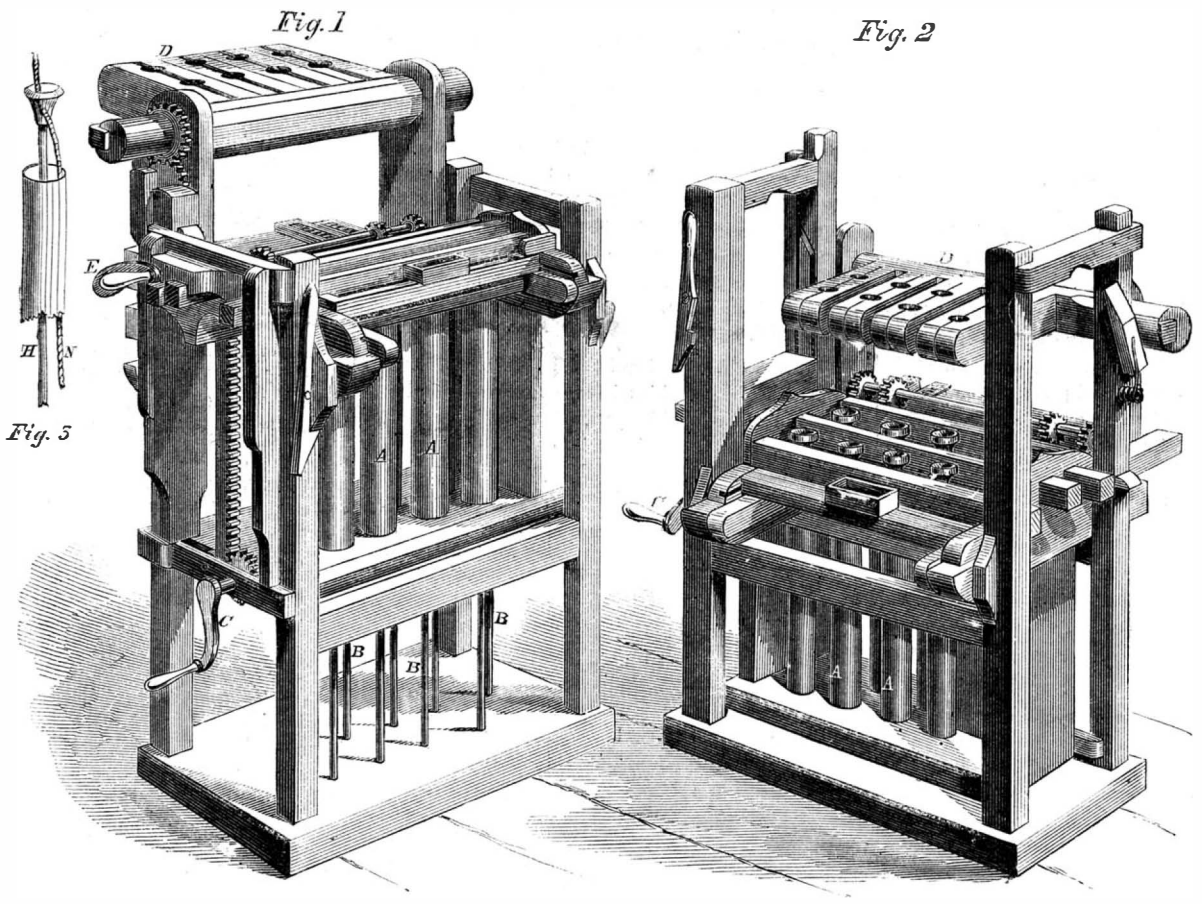
In this machine, the molds for the cylindrical portions of the candles are made separate from the molds for the conical ends or tips, and after the candles have cooled in the molds, the bodies of the molds are forced down over the molds of the tips, thus pushing the candles out of the molds. Fig. 1 represents the machine in position for casting the candles; A A A A being the molds of the bodies, and B B B B the slender cylinders which support the molds of the tips. After the molds are filled and the tallow has cooled, the sliding frame in which the bodies of the molds are secured is forced down by turning the crank, C, to the position shown in Fig. 2, carrying the bodies of the molds down over the stationary tip molds, the supports of which are secured to the stationary part of the frame, and leaving the candles standing up with their lower ends in the tip molds. At the same time, the jaws, D, are brought over into the position shown in Fig. 2, and pressed together, grasping the candles; the wicks are seized by a series of jaws, and thin blades are slipped forward, cutting the wicks off below the tips of the candles.

A reversed motion of the crank, C, now carries the body molds up into the position shown in Fig. 1; at the same time turning the jaws, D, over and opening them, thus dropping the candles into a box placed to receive them.

The upper ends of the molds terminate in holes in a smooth metallic horizontal plate, which forms the bottom of the sprue box for receiving the melted tallow and guiding it into the molds. The front edge of this box is made to roll down out of the way, and the back edge is attached to a rack, so that it may be carried forward by turning the crank, E. After the candles are cool, and before the molds are forced down, this crank is so turned as to carry the back edge of the sprue box forward, scraping the tallow out of the box over the forward edge which rolls down out of the way. A thin steel blade precedes the edge of the box in its course, loosening the cold tallow from the bottom of the box.

The device for drawing the wicks through the molds is shown in Fig. 3. The wick, N, passes from a spool below up through the base of the machine, and is drawn through the tip mold in the manner shown. As the molds are carried up, the wicks are extended through them; and, being seized by the jaws before they are cut, a constant feed of the wicks is maintained from the spools.

The patent for this great labor-saving machine was granted on Jan. 10, 1860; and further information in relation to it may be obtained by addressing the inventor, George A. Stanley, at Cleveland, Ohio.



STANLEY'S IMPROVED CANDLE-MOLDING MACHINE.

THERE is, at the Smithsonian Institute, at Washington, a mass of meteoric iron that fell in Mexico, and weighs over 2,000 lbs.

A GIANT STONE TREE.—The Maysville (Cal.) *Democrat* gives an account of the most gigantic vegetable petrifaction that has ever been discovered. It was lately found by Captain J. Stevens in a desolate district near what is called "High Rock Cannon." It is a tree partly buried in the soil, and which measures 660 *feet in length* and about 60 *feet in diameter*. There was a complete forest of petrified trees found in the vicinity, evidently the remains of antediluvian ages. This great tree lies exactly where it fell, centuries ago, for there are the upturned roots in just the position they would most naturally be, and the prone trunk bears no evidence of having been disturbed. Specimens of this tree, chipped off at 200 feet from the base, have been exhibited at Maysville. The *Democrat* also states that a greater curiosity than this has been discovered in the same situation. It is nothing less than "the shin-bone of a man petrified, and the upper jaw of a grizzly bear, but twice as large as the jaw of any grizzly ever seen in modern times."

THE amendment attached to the judicial bill by Jefferson Davis (which we have formerly noticed) is creating much trouble. Every fire-arm interest in the country is now represented at Washington. The amendment is so well drawn that the department cannot even purchase a water-cooler that has been patented. Arrangements will be made for the immediate repeal of the law at the next session.

SEVERAL engineers connected with the *Niagara* were detached from her when she went on her late voyage to Japan. They complain that this was done to make way for "juniors" who have greater family and political influence.

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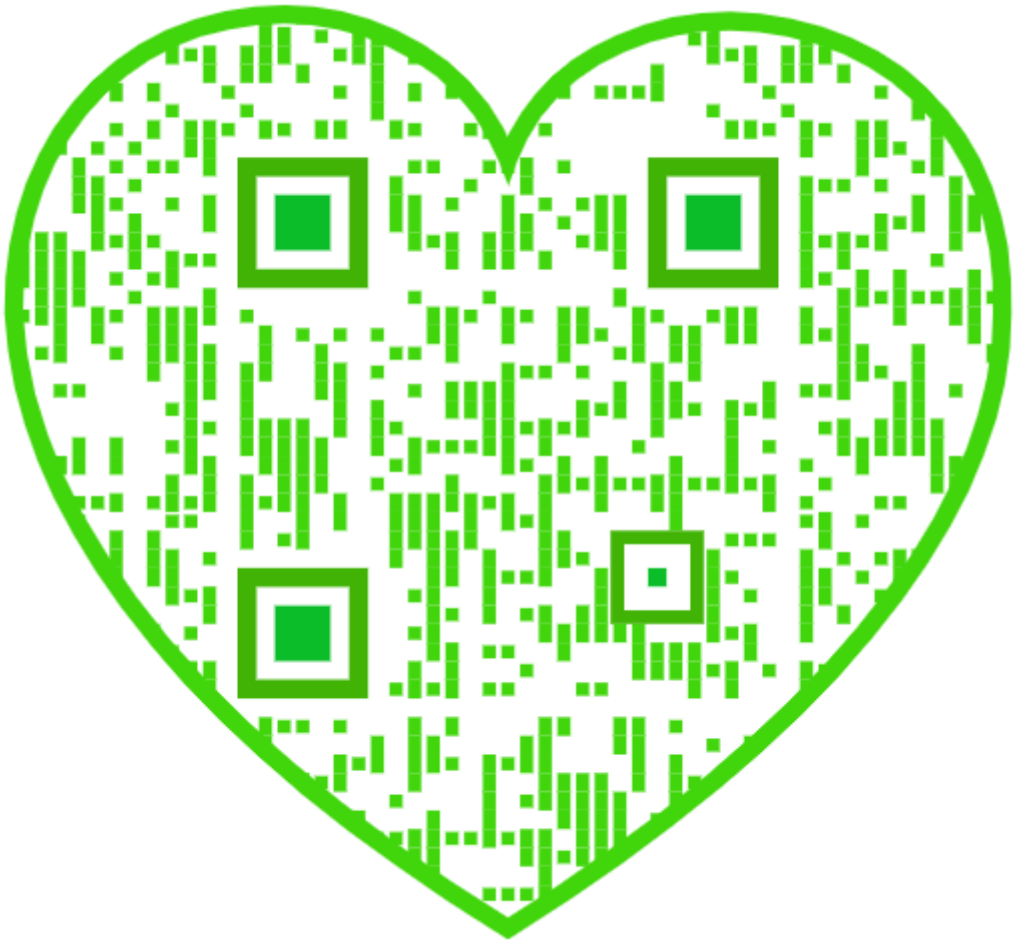

THE BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

The British Association for the Advancement of Science recently held its annual session at Oxford, commencing on the 27th of June. The opening address was delivered by Lord Wrottesley, who especially commented upon the love of astronomy which characterizes British *savans;* the substance of this address (which we condense from the London *Mechanics' Magazine*) will be interesting to every student of the most sublime science within the mental grasp of man.

Star Maps.—It is well observed by Sir John Hershell, that "the stars are the landmarks of the universe; every well-determined star is a point of departure which can never deceive the astronomer, geographer, navigator or surveyor." We must have these fixed points in order to refer to them all the observations of the wandering heavenly bodies, the planets and the comets. By these fixed marks we determine the situation of places on the earth's surface, and of ships on the ocean. When the places of the stars have been registered, celestial charts are constructed; and by comparing these with the heavens, we at once discover whether any new body be present in the particular locality under observation; and thus have most of the fifty-seven small or minor planets between Mars and Jupiter been discovered.

The March of the Sun.—The observations, however, of these smaller stars, and the registry of their places in catalogues, and the comparisons of the results obtained at different and distant periods, have revealed another extraordinary fact—no less than that our own sun is not fixed in space, but that it is constantly moving forward towards a point in the constellation Hercules, at the rate, as it is supposed, of about 18,000 miles an hour, carrying with it the whole planetary and cometary system; and if our sun moves, probably all the other stars or suns move also, and the whole universe is in a perpetual state of motion through space.

Twin Stars.—The measuring the angles and distances from one another of the stars has led to the discovery that many of the very close stars (which appear single to the naked eye) are, in fact, acting as suns to one another, and revolving round their common center of gravity, each of them probably carrying with it a whole system of planets and comets, and perhaps each carried forward through space like our own sun. It became, then, a point of great interest to determine whether bodies so far removed from us as these systems observed Newton's law of gravity; and to this end it was necessary to observe the angles and distances of a great number of these double stars, scattered everywhere through the heavens, for the purpose of obtaining data to compute their orbits. This has been done, and chiefly by private observers; and the result is that these distant bodies are found to be obedient to the same laws that prevail in our own system.

Star Clouds.—The "Nebulæ" are, as it were, systems or rings of stars scattered through space at incredible distances from our star system, and perhaps from one another; and there are many of these mysterious clouds of light, and there may be endless invisible regions of space similarly tenanted. Now, the nearest fixed star of our star system whose distance has been measured, is the brightest in the constellation Centaur, one of the southern constellations; and this nearest is yet so far removed that it takes light, traveling at the rate of about 192,000 miles per second, three years to arrive at the earth from that star. When we gaze at it, therefore, we we see it only as it existed three years ago; some great convulsion of nature may have since destroyed it. But there are many bright stars in our own system whose distance is so much greater than this, as *a* Cygni, for example, that astronomers have not succeeded in measuring it. What, then, must be the distance of these nebulæ, with which so much space is filled; every component star in which may be a sun, with its own system of planets and comets revolving round it, each planet inhabited by myriads of inhabitants!

Comets.—Though the larger and brighter comets naturally excite most general public interest, and are really valuable to astronomers, as exhibiting appearances which tend to throw light on the internal structure of these bodies, and the nature of the forces which must be in operation to produce the extraordinary phenomena observed; yet some of the smaller telescopic comets are, perhaps, more interesting in a physical point of view. Thus, the six periodical comets, the orbits of which have been determined with tolerable accuracy, and which return at stated intervals, are extremely useful, as being likely to disclose facts of which, but for them, we should possibly have ever remained ignorant.

An Ethereal Fluid.—Thus, for example, when the comet of Encke, which performs its revolution in a period of a little more than three years, was observed at each return, it disclosed the important and unexpected fact that its motion was continually accelerated. At each successive approach to the sun, it arrives at its perihelion sooner and sooner; and there is no way of accounting for this so satisfactorily as that of supposing that the space in which the planetary and cometary motions are performed is everywhere pervaded by a very rarified atmosphere or ether, so thin as to exercise no perceptible effect on the movements of massive solid bodies like the planets, but substantial enough to exert a very important influence on more attenuated substances moving with great velocity. The effect of the resistance of the ether is to retard the tangential motion, and allow the attractive force of gravity to draw the body nearer to the sun, by which the dimensions of the orbit are continually contracted and the velocity in it augmented.

How Comets are Disposed of.—The final result will be that, after the lapse of ages, this comet will fall into the sun; this body, a mere hazy cloud, continually flickering, as it were, like a celestial moth round the great luminary, is at some distant period destined to be mercilessly consumed. Now, the discovery of this ether is deeply interesting as bearing on other important physical questions, such as the undulatory theory of light; and the probability of the future absorption of comets by the sun is important as connected with a very interesting speculation by Professor William Thompson, who has suggested that the heat and light of the sun may be from time to time replenished by the falling in and absorption of countless meteors which circulate round it; and here we have a cause revealed which may accelerate or produce such an event.

Feeding the Sun.—On the 1st of September last, at 11h. 18m. A.M., a distinguished astronomer, Mr. Carrington, had directed his telescope to the sun, and was engaged in observing his spots, when suddenly two intensely luminous bodies burst into view on its surface. They moved side by side through a space of about 35,000 miles, first increasing in brightness, then fading away; in five minutes they had vanished. They did not alter the shape of a group of large black spots which lay directly in their paths. Momentary as this remarkable phenomenon was, it was fortunately witnessed and confirmed, as to one of the bright lights, by another observer, Mr. Hodgson, at Highgate, who, by a happy co-incidence, had also his telescope directed to the great luminary at the same instant. It may be, therefore, that these two gentlemen have actually witnessed the process of feeding the sun, by the fall of metoric matter. But, however this may be, it is a remarkable circumstance that the observations at Kew show that on the very day, and at the very hour and minute of this unexpected and curious phenomenon, a moderate but marked magnetic disturbance took place; and a storm or great disturbance of the magnetic elements occurred four hours after midnight, extending to the southern hemisphere. Thus is exhibited a seeming connection between magnetic phenomena and certain actions taking place on the sun's disk—a connection which the observations of Schwabe, compared with the magnetical records of our colonial observatories, had already rendered nearly certain.

An Astronomical Dispute.—A curious controversy has lately arisen on the subject of the acceleration of the moon's motion, which is now exciting great interest among mathematicians and physical astronomers. Professor Adams and M. Delaunay take one view of the question; MM. Plana, Pontecoulant and Hansen, the other. Mr. Airy, Mr. Main, the President of the Astronomical Society, and Sir John Lubbock support the conclusions at which Professor Adams has arrived. The controversy is of the following nature:—The moon's motion round the earth, which would be otherwise uniform, is disturbed by the sun's attraction; any cause, therefore, which affects the amount of that attraction affects also the moon's motion. Now, as the eccentricity of the earth's orbit is gradually decreasing, the average distance of the sun is slightly increasing every year, and his disturbing force becomes less; hence the moon is brought nearer the earth, but at the rate of less than one inch yearly; her gravitation towards the earth is greater, and her motion is proportionately accelerated. It is on the secular acceleration of the moon's mean motion, arising from this minute yearly approach, that the dispute has arisen; so infinitesimally small are the quantities within the reach of modern analysis. Mr. Adams asserts that his predecessors have improperly omitted the consideration of the effect produced by the action of that part of the sun's disturbing force which acts in the direction of a tangent to the moon's orbit, and which increases the velocity; his opponents deny that it is necessary to take this into account at all.

The New Colors.—Turning to the practical applications of chemistry, we may refer to the beautiful dyes now extracted from aniline, an organic base formerly obtained as a chemical curiosity from the products of the distillation of coal tar, but now manufactured by the hundredweight, in consequence of the extensive demand for the beautiful colors known as Mauve, Magenta and Solferino, which are prepared by the action of oxydizing agents, such as bichromate of potash, corrosive sublimate and iodide of mercury upon aniline.

The Antiquity of Man.—From observations made by English and French naturalists in the valley of Somme, France, it would seem as if man was an inhabitant of the earth when many extinct animals—such as the mastodon, Siberian elephant and the extinct rhinocerous—roamed through European forests. It has hitherto been held by geologists that these animals were all extinct before man appeared on the globe; but 1,400 manufactured articles of flint and human teeth have been found with their remains, in situations indicating that man was their cotemporary.

Organic Mechanism.—I cannot take leave of this department of knowledge without likewise alluding to the progress made in scrutinizing the animal and vegetable structure by means of the microscope—more particularly the intimate organization of the brain, spinal cord and organs of the senses; also to the extension, through means of well-directed experiment, of our knowledge of the functions of the nervous system, the course followed by sensorial impressions and motorial excitement in the spinal cord, and the influence exerted by or through the nervous centers of the heart, blood-vessels and viscera, and on the activity of the secreting organs—subjects of inquiry which, it may be observed, are closely related to the question of the organic mechanism whereby our corporeal frame is influenced by various mental conditions.

The Glorious Hymn of Science.—Let us assume that, to any of the classical writers of antiquity, sacred or profane, a sudden revelation had been made of all the wonders involved in creation accessible to man; that to them had been disclosed not only what we now know, but what we are to know hereafter in some future age of improved knowledge—would they not have delighted to celebrate the marvels of the Creator's power? They would have described the secret forces by which the wandering orbs of light are retained in their destined paths; the boundless extent of the celestial spaces in which worlds on worlds are heaped; the wonderful mechanism by which light and heat are conveyed through distances which, to mortal minds, seemed quite unfathomable; the mysterious agency of electricity, destined at one time to awaken men's minds to an awful sense of a present Providence, but in after times to become a patient minister of man's will, and convey his thoughts with the speed of light across the inhabited globe: the beauties and prodigies of contrivance which the animal and vegetable world display, from mankind downwards to the lowest zoophyte, from the stately oak of the primeval forest to the humblest plant which the microscope unfolds to view; the history of every stone on the mountain brow, of every gay-colored insect which flutters in the sunbeam;—all would have been described, and all which the discoveries of our more fortunate posterity will in due time disclose, and in language such as none but they could command. It is reserved for future ages to sing such a glorious hymn to the Creator's praise.

[To be continued.]

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THE HARBOR OF NEW YORK.

[Continued from page 67.]

The detractions from the foregoing results of Mr. Haswell's investigations are:—

1st. That the strength of the current at certain points is sufficiently rapid to keep much of the *silt* in motion at both the ebb and flow of the tide; hence, although its presence is shown, yet its deposit does not occur.

2d. That the water taken from the several locations between Thirtieth-street, on each side of the city, was taken from between the piers; and, although the deposit of *silt* noted is just, as regards the location where the water was taken, a greater deposit is exhibited than if taken from the ends of the piers; this, however, does not affect the results here given, but refers only to the extent of the area of deposit.

In corroboration of these results and in illustration of the effects under consideration, the proprietors of the New York Sectional Dock assure us that the deposit of *silt* upon their tanks, between the piers of Market-street and Pike, averages full five-sixteenths to three-eighths of an inch in one flow of tide, and they are thereby subjected to the delay and cost of dredging under their dock to the depth of seven feet every two years.

In illustration of the effects of the reduction of the quantity of water which originally flowed into our harbor, caused by the encroachments of piers upon our rivers and by the deposits therein, we will mention that the flood tide through the East river and Hell Gate once flowing up to Sand's Point is now arrested at Fort Schuyler; in 1855, the width of the ship channel inside of the bar had narrowed to the extent of half a mile less than it was at the survey of 1836; by a report of A. Boschke, of the United States Coast Survey, made to Professor A. D. Bache (the superintendent thereof), it appears that, in the main ship channel alone, from the South-west Spit to Gedney's Channel, there has been an actual deposit, in 20 years, of a volume of sand equal to 2,532,600 cubic feet; and from the report of the Harbor Commissioners, in 1857, made to the Legislature of this State, it appears that the Jersey "flats" are rapidly *silting* up. These facts, in our opinion, form an alarming exhibition—one which involves considerations demanding the immediate attention of all who feel interested in the commercial interests of this city; for, without remedial action, the width of the channel and depth of water on our bar will become so reduced as to preclude the admission of vessels of the largest size into our harbor.

The course of remedial action that can most easily and effectually be introduced at this time is the effective cleaning of our streets and piers, in order to remove the wash into the rivers therefrom, and the cessation of the practice of depositing the dredging of our "slips" into the channels of the rivers. We believe that no one who gives the subject his attention will, for a single moment, permit the temporarily-increased expenditure consequent upon the measure here suggested, to be weighed against the great advantages to be derived therefrom.

The operation of dredging slips, as usually performed, is as follows:—The deposits in the slips are removed to the channels of the North river and the East, when the *silt* or mud is swept by the current of the tide, back to the slips and upon the flats of New Jersey and Long Island; and the stones, bricks and such other matter, too heavy to be moved by the detrital action of the current, fill up the channel in proportion to their volume. There is a general opinion prevailing with the public that the discharge from our sewers and the deposits from the slips into the rivers are "washed" (as it is termed) into the sea and Long Island Sound. If this were the operation it would be well for the interests involved in the subject under discussion; but, as it happens, a brief examination of the case presents a very different result. Thus, the deposit in our slips—the *mud*, independently of stones, bricks, &c.—is composed of gravel, sand, clay and feculent matter, which, when transferred to the channels of the rivers, is submitted to the detrital action of a current of three or four knots per hour, eighteen miles distant from the sea. With these elements, then, it would be extremely difficult to show how any portion of this mud—other than the soluble part of it, and the coloring matter therein—could ever reach Sandy Hook.

A view of the elements submitted above and a consideration of their operation will furnish the following deductions:—

1st. That the deposit of *silt* and detrital matter into the rivers bordering this city is so considerable in amount that the slips of the are very rapidly being filled; the bays, indentations and flats upon the shores of New Jersey and Long Island, the Harlem river and all places where the currents are comparatively feeble, are being rapidly *silted* up by the tidal currents, and along with the accretions of the wash upon the shores of our harbor, the tidal volume thereof is being reduced, and upon the extent of that tidal volume depends the volume of water passing the bar at Sandy Hook—a point involving the commercial value, if not the physical existence, of this harbor.

2d. That the system of the dredging of our slips, as generally pursued, namely, the removal of the deposits therein from below low-water depth, to be exposed to the currents in the rivers, ends in but a transfer of them to other slips and shoal places, the effect of which is to involve the loss of time and cost of a *re*-removal of the deposits from the slips.

3d. That by the thorough cleaning of the streets and piers of this city, Brooklyn and the neighboring cities, the deposits in the slips would be lessened and the necessity for dredging them would be rendered less frequent.

4th. That economy in the current expenditures of cleaning our streets and dredging slips demands that the streets and piers of our cities should be thoroughly cleaned; and that, as is generally the method, the transfer of the material dredged from our slips to the channels of the rivers, should be *forthwith* forbidden, since the increased cost consequent upon the removal of the mud, &c., to the main land, is quite inconsiderable when compared with that of its repeated removal by being deposited in the channels of the rivers

[To be continued.]

THE ART OF SOLDERING METALS.

This is one of the most necessary and universal manipulations connected with several of the mechanic arts, and a knowledge of it is also very useful to almost every amateur mechanic. Its nature consists chiefly in joining the edges of plates of metal—principally tin and lead—with a softer metal than themselves, so as to form a close and perfect union. As a general principle of primary importance in soldering, it is neccessary that the solder with which a joint is to be effected should be fusible at a lower temperature than the metal to be joined; were it otherwise the heat would frequently injure or destroy the article under manipulation. It is also generally desirable that the solder should be similar in color to the metal to be joined. To meet these requirements, various kinds of solder are used in joining different metals; the simplest to manage is known as "soft solder." Various recipes are given for making it, it is usually composed, however, of one part of tin, and one part of lead: where the most fusible solder possible is required, the compound should consist of three parts of tin to two of lead.

In all soldering processes it is necessary to add something to assist in the fusion of the metal, which is known as the "flux." In using soft solder, either common resin or chloride of zinc are generally used as fluxes. To prepare the latter, a wide-mouthed bottle is half-filled with hydrochloric acid, and into this is thrown a few fragments of zinc: this should be placed in the open air until effervescence has ceased, as the fumes given off will be found noxious in a room. To be assured that no free acid is left, a few pieces of zinc should remain undissolved. The preparation is then ready for use, and will keep good for any length of time.

The exact method of procedure in effecting a joint will much depend on the shape and nature of the article. Suppose two pieces of lead are to be joined, the ends of both are to be well cleaned by scraping or filing; one of them is then covered with a little powdered resin, and a small piece of solder is to be laid upon it, and then submitted to sufficient heat, when the solder will run over and coat the whole of the cleaned metal.

There are various modes of applying heat in soldering; it may be effected either by a blow pipe, or the "soldering-iron." The latter consists of a piece of copper attached to a piece of iron, which is held in a wooden handle. Its end, for use, should always be tipped with solder. To effect this, the copper should be filed clean and heated; its end should then be rubbed on a piece of sal-ammoniac. On applying it to the solder it will at once be coated. Care should be taken in the subsequent heating, not to burn off this tinned point, or it will be necessary to repeat the process. Just less than a red heat will generally be sufficient. The flame of gas, where available, will be found very convenient, being comparatively free from smoke and giving great heat.

To return to the joining of the lead. If any part of the scraped metal become smoked, it will be necessary to throw on such part a little more powdered resin, and the heat again applied; using, if necessary, a piece of brass or copper wire to spread the softened solder over the part. If the smoking is not considerable, this will be sufficient, but sometimes it may be necessary to begin afresh, cleaning off and re-scraping the smoked part, again adding fresh resin and solder and applying heat. When a coating of solder is applied, whilst it is still soft, it is to be rubbed with a piece of cloth, and all but a thin film or coating is to be removed.

The process will be very nearly the same if chloride of zinc be used as the flux instead of resin. In this case the trouble will be a little less, and the solder will more rapidly flow; but it is thought by some that the joint is not so strong.

In some cases difficulty is experienced in holding pieces of metal in firm contact during the process of soldering. They may sometimes be held sufficiently firm by the aid of a small vice. In other cases slightly riveting previous to soldering, will be desirable; or, where the circumstances admit of it, binding by means of fine wire will be found efficient. The ends to be joined are then to be scraped or filed perfectly clean. In cases of this kind, the chloride of zinc will be a more convenient flux than resin; the parts to be joined being moistened with the solution, the wire supports are to be arranged so as to hold the pieces firmly, and a few fragments of solder being laid on the joint, the heat of a flame or soldering bolt being applied, the solder will run and attach itself to all the metal to which the chloride of zinc has been applied. After cooling, the superfluous solder may be filed or scraped away with a knife.

Various kinds of hard solder are used, their compositions varying with the metal to be joined, and the color thus rendered desirable. The flux will also vary with the composition of the solder, borax being used with several kinds of hard solder. The use of the blowpipe will be generally necessary to effect a junction with hard solder, the heat of the soldering bolt being insufficient, but soft solder will generally best serve in all the operations of the amateur. Hard solder for brass is made with eight parts of copper and one of zinc. The copper is first melted in a crucible, the zinc, in the meantime, being heated. When the copper is melted, the hot zinc is thrown into it, and, the crucible being covered up, the whole is shaken together. In a few minutes, it is poured out into a vessel of cold water. In order to granulate it, the twigs of a birch broom are held over the water, and the metal, passing between them, is divided into grains as it drops into the water.

In making hard solder, it should be born in mind that it is harder and less fusible in proportion as it contains more copper. A somewhat softer and more fusible hard solder is made of six parts of brass, one of zinc, and one of tin. The brass is first melted, the tin then added and lastly the zinc, which should, as before described, be previously well heated. The whole being then well agitated, it is to be granulated and cooled, as before described.

The parts to be joined are to be scraped or filed perfectly clean, and a portion of the flux—borax dissolved in water being commonly used—added, with a grain or two of the solder; the whole is then to be submitted to the flame of a blowpipe, until it runs. A well-soldered joint, managed in this way, is often little less strong than the metal itself.

Solders must be selected in reference to their appropriate metals. Tin plates are soldered with an alloy consisting of from one to two parts tin, with one of lead. Pewter is soldered with a more fusible alloy containing a certain proportion of bismuth, added to the lead and tin. Iron, copper and brass are soldered with spelter—an alloy of zinc and copper in nearly equal parts. Silver is soldered, sometimes with pure tin, but generally with silver-solder—an alloy consisting of five parts of silver,

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six of brass, and two of zinc. Zinc and lead are soldered with an alloy of from one to two parts of lead with one of tin. Platinum, with fine gold. Gold, with an alloy of silver and gold, or of copper and gold; &c. In all soldering processes, the following conditions must be observed:—The surfaces to be united must be entirely free from oxyd, bright, smooth and level. The contact of air must be excluded during the soldering, because it is apt to oxydize one or other of the surfaces, and thus to prevent the formation of an alloy at the points of union. This exclusion of air is effected in various ways. The locksmith encases in loam the objects of iron or brass that he wishes to subject to a soldering heat; the silversmith and brazier mix their respective solders with moistened borax powder; the coppersmith and tinman apply sal ammoniac, resin, or both, to the cleaned metallic surface, before using the soldering-iron to fuse them together with the tin alloy.

THE GREAT METEOR.

As some of our readers may not have seen a description of the great meteor of the 20th ult., we give an account by one of our correspondents:—

MESSRS. EDITORS:—As I was sitting in my room last evening, my attention was attracted by a light outside, which, at first, was like that of an ordinary lamp or candle, casting a faint shadow in places, but rapidly increasing in brightness till the whole place was so illuminated that common newspaper print could have been read by it, had it been sufficiently lasting. I knew then that it must have proceeded from a meteor of uncommon brilliancy, casting a light of a lurid nature similar to that of lightning, but far more steady. I much regretted that it was out of my power to see the object itself, and give you, from personal observation, a full description of it. The following particulars were kindly furnished me by the Rev. Thomas K. Beecher, of Elmira, who had a good opportunity of witnessing this interesting phenomenon:—

At about five minutes before 9 o'clock (New York City time), the luminous body rose above the horizon at a point about 5° north of west, keeping from first to last near the path of a great circle. When it had attained an altitude of say 6° above the horizon, its light was sufficiently bright to attract attention towards it. At this time, its apparent motion was slow; it ascended more rapidly, leaving after it a luminous train something like that of a rocket, its brilliancy increasing, until it was sufficient to obscure the bright star Vega, in the constellation Lyra. This fact will enable you to form some estimate of its brightness. The light it gave out resembled that of a first-class "Roman candle." It appeared to have a circular disk, the angular magnitude of which it was not easy to estimate.

When it had ascended to within about 10° of the zenith, it scintillated and cast off two bright little globes of fire, like beautiful sparks, which soon, however, vanished. It continued on its course, descending in the east into a bank of clouds, which it caused to assume a dull, ruddy hue, similar to that seen when lightning flashes behind distant clouds. As it passed breaks or openings in these clouds it shone out with great splendor, till it finally disappeared beneath the horizon. The time it occupied in its flight over the heavens was about 45 seconds.

In about 1¾ minutes after the scintillation abovementioned, a dull explosion, like that produced by heavy artillery at a distance, was heard. If it was caused by the disruption of the meteor, it would indicate that it was 22 or 23 miles off at the time.

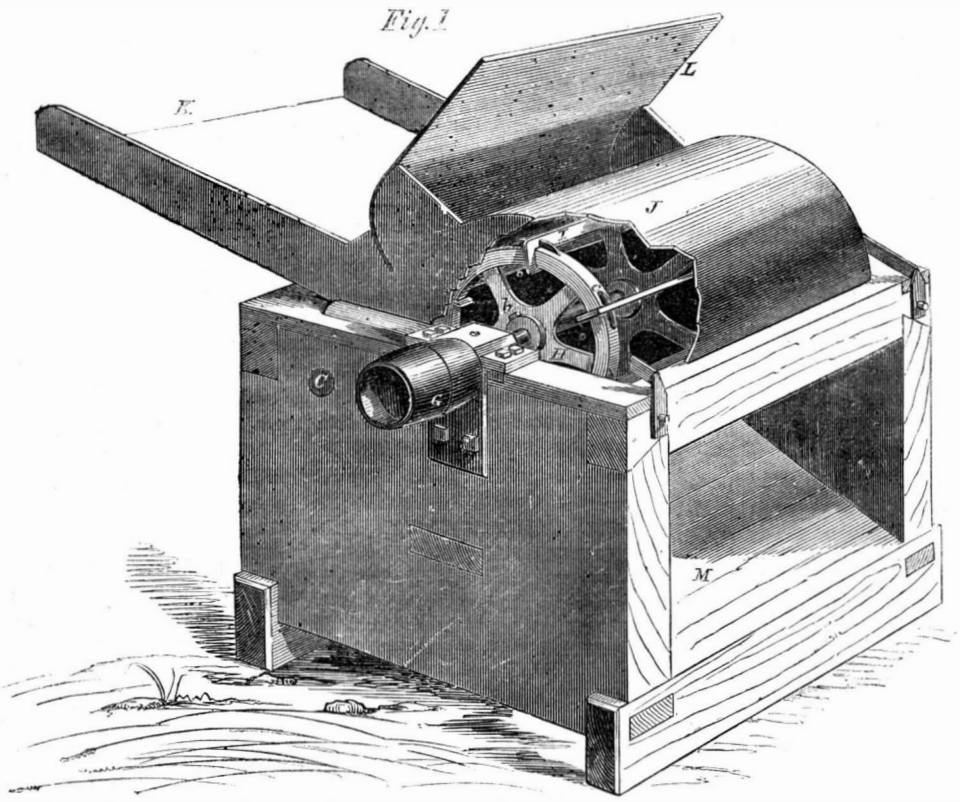
E. M. RICHARDS.

Elmira, N. Y., July 21, 1860.

IMPROVEMENT IN THRESHING MACHINES.

To understand this simple but valuable improvement in one of the parts of the common horse-power threshing machine would require but a glance from one familiar with these great savers of labor, and but little effort on the part of a person who never saw a similar machine. This style of machine consists of a cylindrical frame of iron, revolving rapidly in close proximity to a corrugated concave iron bed, and the wheat or other grain in the head of the straw being fed between the cylinder and the bed, has the grain beaten out of it by

Fig. 1



WILLBANKS' IMPROVED THRESHING MACHINE.

the ribs of the cylinder. In the annexed cuts, F and H represent the rotating cylinder, and B the concave bed. The grain in the straw is fed into the machine at K, and passing downward beneath the cylinder, the grain as beaten out runs down at, M, while the light dust is carried around and blown out at I. Experience has developed considerable practical difficulty in securing the longitudinal bars to the cylinder heads, the bars

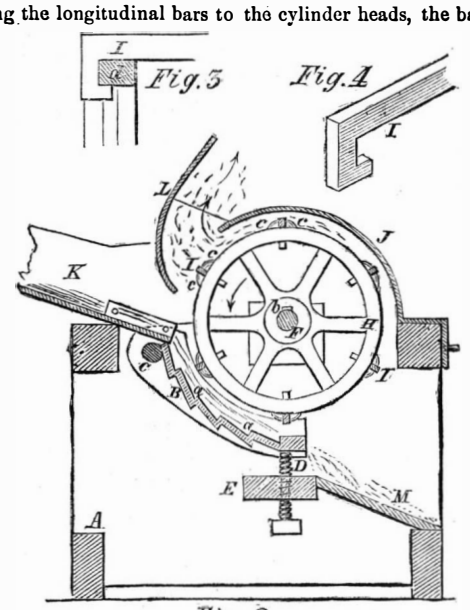


Fig. 2

requiring to be of wrought iron, and it being best and cheapest to make the heads of cast iron. If they are fastened with rivets, it is not practicable to take the machine apart for transportation, and screws are very apt to get loose.

By this invention the ribs are secured in the most thorough and complete manner, and the cylinder may be very quickly and easily taken apart. The end of the bar is made in the form of a hook, as shown in Fig. 4, and is attached to the rim of the cylinder head, as shown in Fig. 3. Projections, *c c*, are cast upon the rim of cylinder head with spaces between them just sufficient to admit the ribs, and in the outer cylinder heads slots are made in radial directions from the center, to receive the bent ends of the ribs. The bars are placed in position while one head is loose upon the shaft, and the head is then forced outward and secured in place by a key; thus fastening all the bars at once, and they may be as readily loosened for removal.

The patent for this invention was procured, through the Scientific American Patent Agency, for the inventor, D. A. Willbanks, of Harmony Grove, Ga., on Dec. 6, 1859, and further information in relation to it may be obtained by addressing S. A. Heath & Co., at No. 102 William-street, this city.

AMONG the novelties which the scientific world has lately heard of is the invention of an Italian—a Florentine monk, it is said — who has devoted many years to the study of electricity and telegraphic matters. He has some extraordinary inventions which he is submitting to the Emperor of the French. It is stated that among them is a discovery of the means of transmitting *fac-similes* of hand-writing and manuscripts from station to station, so that a telegram may become a legal document. He can also transmit a likeness by this agency, to be re-produced at the other end of the wire. Proposals have been made to the man-of-science to visit England. We suspect the likenesses will be hardly equal in accuracy to the best of Brady's photographs.

THE Cleveland and Erie Railroad Company have now in use a new style of small locomotives for light trains. The Cincinnati *Commercial* says of one of these engines:—"It is a neat little affair, having the engine and tender on the same frame. The record for this locomotive—the 'Reindeer'—for May, is undoubtedly unequaled for economy by that of any other engine doing the same service anywhere. During the month it ran 3,756 miles with only 25½ cords of wood and 4 gallons of oil. A close calculation shows that it ran 104 miles to a pint of oil. The total expense of oil, waste and fuel per mile run was only 1 79-100 cents. The 'Reindeer' weighs 15 tuns when supplied with wood and water for the trip. The train usually consists of one passenger and one baggage car, but she will take three loaded cars without increasing the expense or diminishing the speed. Her daily time is 68 miles each way, which is done in 3 hours, or 22 2-3 miles per hour, including 12 stops in the 3 hours."

ECONOMY OF STEAM IN SHIPS.—A recent number the London *Mechanics' Magazine* contains an account of a new steamship, named the *Thunder*, built in London, and having a displacement of 2,000 tuns, which has run at the rate of 11 knots per hour with the consumption of only 15 tuns of coal in 24 hours. This was at the rate of 2¼ lbs. of coal per horse-power per hour. The pressure of steam which she carries is 10 lbs.; but she has superheaters, where the steam is raised to the temperature of 310° before it enters the cylinders, in which there are unusually large inlet and outlet passages for the steam.

THE rifle gun of Ex-senator James, of Rhode Island, is said to be superior in accuracy and range to that of the celebrated Armstrong gun, in England. A series of experiments, under charge of a board of military and naval officers, is about to be undertaken with the former and more formidable weapon.

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A DEFENDER OF LAGER BIER.

MESSRS. EDITORS:—Permit me to say that an article published on page 21 of the present volume of the SCIENTIFIC AMERICAN, under the caption of "What is Lager Bier?" has created no little surprise in unbiased scientific circles. Passing over what belongs to ethics and morals, I ask the privilege of correcting those palpable mistakes which have crept into your statements, so far as chemical data are concerned.

You deny the nutritive qualities of lager bier, although they amount to from 5 to 10 per cent in a well-brewed article. Is there any fermented or other beverage used by the human family which contains comparatively more? You speak of the disappearance of the nutritive constituents of the malt in consequence of its extract being converted, by the fermentation, into carbonic acid gas and alcohol. What does become of the phosphates and alkalies of the malt? Are they all precipitated in the shape of yeast? No; not even the azotes. No reasonable consumer of lager bier has ever fancied to look upon his favorite drink as upon a substitute for food; though it contains enough of nourishing (plastic) principles and less of spirits to make it immensely preferable to any other fermented liquor, even many wines not excepted. That writer who has styled lager bier *the milk of men* has not said too much; for it is similar in constitution to that universal food. If you deduct the small per-centage of alcohol contained in lager bier, you have a diluted milk, spiced by the constituents of hops. "Grain extract," you say, "is not the most fit food for a healthy man;" I admit this assertion to be correct to a certain extent. But since it is an established chemico-physiological fact that the food of man is divisible into two distinct classes, namely, the one which furnishes the *plastic elements* and the one which creates the necessary *animal heat* in the constitution of man, it is self-understood that man cannot live upon any one aliment, but that change and intermixture of nutritive matter is indispensable to feed him well. Among all the victuals, however, which represent both the plastic and heat-creating elements of food, *milk* and *lager bier* come nearest to the point of universal availability. Pure milk presents, in its casein and serum, the azotes, phosphates and alkalies—the plastic elements; its fatty matter constitutes the principle which produces the animal heat in the system of man; while in the lager bier, the malt-extract accounts for the former, and the alcohol for the latter ingredients. All those foods that contain azotes (nitrogeneous combinations), phosphates and alkalies, are classed among the plastic nutriments; while all those foods that are principally made up of fat, starch, sugar and alcohol (carbonaceous matters), belong to the animal-heat-creating kind. The foregoing briefly-stated but scientific facts account for the superiority of milk as *food*, because it is in a liquid state, which renders assimilation most easy; as also for the preference of lager bier as a *drink*, because it contains nourishing constituents in a state of solution.

Your parallel between lager bier and ale is not corroborated by reliable analytical research. In lager bier the alcoholic proportion should never be less than 2·5, and is never higher than 4 per cent. Strong beers as, for instance, ale, porter, brown stout, bock, salvador, &c., contain as much as from 5 to 11 per cent of alcohol, The per-centage on extractive matters must be in proportion to the amount of alcohol, or else, whence could the latter come in the course of fermentation? Therefore, while in lager bier the malt-extract figures from 5 to 10 per cent, it is found to the amount of from 5 to 15 per cent in strong beers. But as to the peculiar *modus operandi* resorted to in the preparation of the many different kinds of beer in use, it is universally admitted by all the chemical and medical authorities of note, that the process of making lager bier is—in a sanitary, scientific and technical view—the most correct and satisfactory one.

With regard to the intoxicating qualities of lager bier it is self-evident that, with a person who is accustomed to its consumption, it requires an unusual and unreasonable number of glasses to throw him out of the condition of soberness. If such cases do sometimes happen, it furnishes no reason for a wholesale denunciation of the beverage itself. One thing is indisputably true, however, namely, that not one half the quantity of any sort of strong beer—not to say a word about the generally-beloved sherry, port, brandy and whisky—can be consumed with as much impunity as lager bier. Strong animal and even bestial propensities are (alas!) met with among men in all civilized nations; one fact, however, is firmly established, namely, that less drunkenness is encountered among those people who are chiefly addicted to the consumption of acidulous wines and lager bier than is found among those who are habitual drinkers of ales and spirits. The immoderate use of the most innocent alimentary as well as luxurious compounds and products may be followed by consequences in any one individual which will make us abhor his habits; but this fact can never lead us to a wholesale denunciation of tea, coffee, sparkling waters, fruits, confectioneries, ice-creams, meads, vegetables, wines and beers; for they altogether constitute the nutriments, now-a-days, of civilized humanity. Nothing, therefore, can be more fruitless than to permit a man's ignorance or idiosyncracies to precipitate him into a warfare against any of the acknowledged "institutions" of society, so far as its physical sustenance and comfort are concerned. We have had our tea, coffee, potato, and other wars; but yet the world moved quietly on towards greater and still greater perfection. The lager bier war is at present "all the rage;" nevertheless that drink will fulfill its great moral and social mission against brandy, whisky—in short, against every species of *aqua vitæ*.

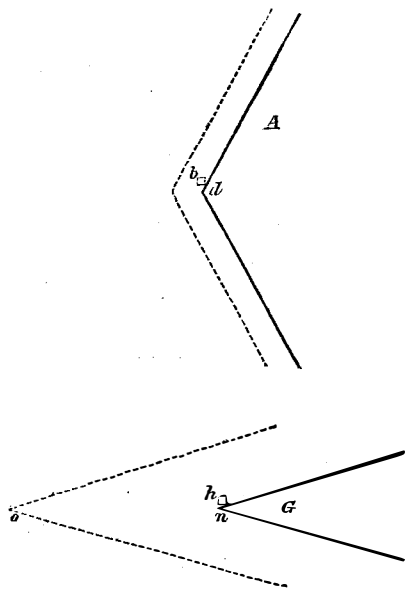
I assure you, Messrs. Editors, that many more arguments could be adduced in behalf of lager bier, recommending it as being a desirable drink in the moral, social and dietetic views of the question; but I will not encroach too much on your valuable space.

CHARLES RIEDEL, PH. D.

New York, July 28, 1860.

THE MODEL OF SHIPS.

The presence of the *Great Eastern* in our harbor has revived the discussion of this inexhaustible subject. Though it is one of the most difficult problems to investigate that has ever been undertaken, there are a few positions in relation to it that are indisputable, and it is important to keep these in mind as the foundation for new acquisitions of knowledge in the matter. The resistance offered to the motion of a vessel, which has to be overcome by the propelling power consists of five elements—the inertia of the vessel, the inertia of the water, the friction of the sides of the vessel against the water, the friction of the particles of water against each other, and the resistance of the air. The inertia of the vessel exists only at starting and while the speed of the vessel is being increased, and the others are all overwhelmed in importance by the inertia of the water. As a vessel is pushed forward in the water, the liquid which occupies the space into which the vessel is moving has to be forced out of the way, and, like all other amtter at rest, it requires a certain measure of force to put it in motion, the amount of force being in direct proportion to the velocity of motion required. Let us observe the action of two bows of vessels, A and G, one of them very blunt and the other very sharp, upon a



cubic foot of water which lies in their path. Suppose the cubic foot of water to be represented by *b* and *h*. In order to move this quantity of water sideways a given distance, say from *b* to *c*, or from *n* to *o*, the blunt bow A, advances only from *d* to *e*, while the sharp bow advances from *n* to *o*. Hence, to overcome the inertia of the water, it will require just the same power to propel the blunt bow, A, from *d* to *e* in a given time that it will to propel, the sharp bow, G, from *n* to *o*, in the same time; that is, if the motion of the water is directly sideways.

But the motion of the water as it is displaced is not exactly sideways, and precisely what the direction of the motion is, and how much water is moved, is a problem which has never been solved, and perhaps never will be. The motion however must be somewhat upward as well as lateral, and there can hardly be a doubt that the principal motion is sideways. In which case other things being equal, the speed of vessels in overcoming their principal resistance would be almost exactly in direct proportion to the sharpness of the bows. We believe all experience confirms this conclusion.

OUR SPECIAL CORRESPONDENCE.

Novel Feat in Engineering; the Swoop of a Locomotive—The Steam Plow in its Right Place—High-pressure Engines and Boiler Explosions to be Abolished from the Western Waters—General Summary and Conclusion.

NEW ORLEANS, La., July 8, 1860.

MESSRS. EDITORS:—On the railroad between Houston and Eagle Lake, in Texas, a feat is performed which, I presume, is entirely unprecedented in engineering. At the crossing of the Brazos river, the road is completed on each side to the bank, and a temporary track laid down each bank and across a temporary bridge, which is some 30 or 40 feet below the level of the permanent road. The design was to cross this bridge, until the permanent one was completed, by letting the locomotive and cars slowly down the bank with ropes, and then hauling them up on the other side. But at one time the locomotive, in descending, broke loose, and, sweeping through the hollow by its momentum, ascended the opposite bank in safety. Since that time the passenger trains are run through the hollow in this manner, sweeping gracefully downward and rising on the opposite side, like the swoop of a hawk on its prey. I have been something of a traveler, but this was the first time that I ever followed a locomotive down the steep bank of a river! It is said that the civil engineers object to this mode of proceeding, on account of the tremendous strain on the road-bed in that part which changes the line of motion from the descending to the horizontal direction.

On the road which is in process of construction from Houston to New Orleans, the steam plow has been used successfully. The land about Houston is very level for many miles in nearly every direction; and after the track was laid across the level prairie, a gang of plows was attached to the locomotive at each side to finish the ditches. An intelligent civil engineer assured me that the work was performed in the smoothest and most perfect manner conceivable. In my opinion, this is the only place in which the steam plow can be used with advantage—in a place where a railroad can be used to run the locomotive on. A steam engine is too heavy to be a practicable power for drawing plows in cultivated fields.

In a pleasant conversation with the remarkably intelligent engineer of the steamer *Texas*—on the way from Galveston to this place—he told me that he had been contending for years, and a number of other engineers with him, that the general idea that the waters of the Ohio and Mississippi rivers were unfit for use in low-pressure engines is all a mistake. He says that a large, fine boat, driven by a low-pressure engine, has been running some few years between Cincinnati and Louisville. I suppose this fact is not new to you, but to me it is one of the most interesting items of intelligence that I have met with for a long time. It seems to me to contain the sure promise of the rapid substitution of low for high-pressure engines on all of our larger rivers, and, consequently, of the cessation of that awful destruction of life which is constantly occurring from the explosion of steam boilers.

Having completed my rapid survey of Texas, I suppose you would like to have the briefest possible statement of its most prominent peculiarities. Texas is a great, beautiful, dry, windy, cotton, cattle, Methodist, live-oak State. B.

NEW wheat from Georgia, Alabama, Missouri and Kentucky has arrived in the market. The berry is plump and beautiful, and sales of several hundred bushels in one lot have brought $1.50 per bushel.

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JOURNAL OF PATENT LAW.

THE EFFECT OF NOT FILING A DISCLAIMER.

We take, from the records of the legal reports, a decision of the Supreme Court of the United States, growing out of the celebrated McCormick's reaping machine, which decision will serve to show us the view which courts are disposed to take of inventors' claims, when presented before them embarrassed by clauses claiming that which is not really intended, and when patentees have, from various motives, delayed making the necessary disclaimers. It is very desirable that a patent should, in the first instance, cover just what is claimed, and no more; but if the patentee has been so unfortunate as to claim more than he has really invented, the next best thing for him to do is to file a disclaimer. It is often a very nice question to determine, whether a clause in a patent claims more than is legally patentable by the inventor or not; and in such instances a disclaimer is unavoidable, and for just such cases disclaimers were provided.

The above-mentioned suit was brought by McCormick against Seymour & Morgan for a violation of his patent right on his reaping machine. The defendants, among other matters of defense, alleged that the second claim was not new; and that as there had been unreasonable delay in the disclaimer of it, the plaintiff was not entitled to recover at all, or, admitting that he had not been negligent in filing a disclaimer, he still was not entitled to costs. At the trial the judge charged the jury as follows:—

"The claim in question is founded upon two parts of the patent. As the construction of that claim is a question of law, we shall construe it for your guidance. In the fore-part of the patent we have a description of the blade, and of the blade-case, and the cutter, and also the mode of fastening the blade and the blade-case and the cutter, and of the machinery by which the arrangement is made for the cutter to work. We have also the description of the spear-shaped fingers, and of the mode by which the cutter acts in connection with those fingers. Then among the claims are these:—'2d, I claim the reversed angle of the teeth of the blade, in manner described. 3d, I claim the arrangement of the construction of the fingers (or teeth for supporting the grain), so as to form the angular spaces in front of the blade, as and for the purpose described.' Now, it is insisted, on the part of the learned counsel for the defendants, that this second claim is one simply for the reversed angles of the sickle-teeth of the blade. These teeth are common sickle-teeth, with their angles alternately reversed in spaces of an inch and a quarter, more or less. The defendants insist that the second claim is merely for the reversed teeth on the edge of the cutter, and that the reversing of the teeth of the common sickle, as a cutter in a reaping machine, was not new with the plaintiff; and that if it was new with him, he had discovered it and used it long before his patent of 1845. The defendants claim that one Moore had discovered it as early as 1837 or 1838; and it would also seem that the plaintiff had devised and used it at a very early day after his patent of 1834—that is, the mere reversing of the teeth. But, on looking into the plaintiff's patent more critically, we are inclined to think that, when the plaintiff says, in his second claim, 'I claim the reversed angle of the teeth of the blade, *in manner described*,' he means to claim the reversing of the angles of the teeth *in the manner previously described in his patent.* You will recollect that it has been shown, in the course of the trial, that, in the operation of the machine, the straw comes into the acute-angled spaces on each side of the spear-shaped fingers, and that the angles of the fingers operate to hold the straws, while the sickle-teeth, being reversed, cut in both directions as the blade vibrates. The reversed teeth thus enable the patentee to avail himself of the angles on both sides of the spear-shaped fingers; whereas, if the sickle-teeth were not reversed in sections, but all ran in one direction like the teeth of the common sickle, he could use the acute angles upon only one side of the fingers, because the cutter could cut only in one direction. We are therefore inclined to think that the patentee intended to claim, by his second claim, the cutter having the angles of its teeth reversed, in connection with the angles thus formed by the peculiar shape of the fingers. And as it is not pretended that any person invented that improvement prior to the plaintiff, the point relied on in this respect by the learned counsel for the defendants fails."

To so much of the charge of the court as instructed the jury, in substance, that the plaintiff, in his patent of Jan. 31, 1845, did not claim the reversed angle of the teeth of the blade as a distinct invention, but only claimed it in combination with the peculiar form of the fingers described in the same patent, the defendants counsel excepted. He also requested the court to instruct the jury that if they should be satisfied that Hiram Moore was the first inventor of the reversed angle of the teeth of the blade, and that the plaintiff was notified of that fact by the testimony of Moore on the trial of this cause in June, 1851, and had not yet disclaimed that invention, then, in judgment of law, he has unreasonably delayed filing his disclaimer, and the verdict should be for the defendants. The court declined so to instruct the jury and the defendants' counsel excepted.

The plaintiff obtained a verdict for $7,750, and a judgment, which, including costs, amounted to $10,348 30, was entered in his favor. From this judgment the defendants appealed to the Supreme Court, where the case was ably argued and the following decision rendered:—

Nelson, J.—"In the course of the trial, a question arose upon the true construction of the second claim in the patent, which is as follows:—'I claim the reversed angle of the teeth of the blade in the manner described.' This claim was not one of the issues in controversy, as no allegation of infringement was set forth in the declaration. But it was insisted, on the part of the defendants, that the claim or improvement was not new, but had before been discovered and in public use; and that, under the ninth section of the Act of Congress passed March 3, 1837, the plaintiff was not entitled to recover costs for want of a disclaimer of the claim before the suit was brought; and that if he had unreasonably neglected or delayed making the disclaimer, he was not entitled to recover at all in the case. The ground upon which the defendants insisted that this claim was not new, was, that it claimed simply the reversed angle of the teeth of the blade or cutters. The court below were of opinion that, reading the claim with reference to the specification in which the instrument was described, it was intended to claim the reversed angle of the teeth in connection with the spear-shaped fingers, arranged for the purpose of securing the grain in the operation of the cutting, the novelty of which was not denied. Now, the majority of this court are of opinion that this construction of the claim cannot be maintained, and that it is simply for the reversed angle of the cutters; and that there is error, therefore, in the judgment, in allowing costs to the plaintiff. In respect to the question of unreasonable delay in making the disclaimer, as going to the whole cause of action, the court are of opinion that the granting of a patent for this improvement, together with the opinion of the court below, maintaining its validity, repel any inference of unreasonable delay in correcting the claim; and that, under the circumstances, the question is one of law. This was decided in the Telegraph case, in which the chief justice, in delivering the opinion of the court, observed that 'the delay in entering the disclaimer is not unreasonable, for the objectionable claim was sanctioned by the head of the office; it has been held to be valid by a circuit court, and differences of opinion in relation to it are found to exist among the justices of this court. Under such circumstances, the patentee had a right to insist upon it, and not disclaim it until the highest court to which it could be carried had pronounced its judgment.'"

There were other points raised in the case which it is unnecessary for us to mention. The previous judgment was affirmed, with the qualification that, on the case being remitted to the court below, the taxation of costs should be stricken from the record.

HOW TO PREVENT SORE SHOULDERS IN WORKING HORSES:—An exchange says:—The plan we have tried and never found to fail is to get a piece of leather and have it cut into such a shape as to lie snugly between the shoulders of the horse and the collar. This fends off all the frictions, as the collar slips and moves on the leather and not on the shoulders of the horse. Chafing is caused by friction; hence this remedy is quite a plausible one, and is much better than tying slips of leather or pads of sheepskin under the collar.

DID THE ATLANTIC CABLE EVER SPEAK?

The grand celebration of the successful laying of the Atlantic Telegraph Cable, two years ago, can never be forgotten, more especially as the whole affair afterwards turned out to be a premature and "overdone" demonstration. In connection with this subject, although it was given out that Queen Victoria sent a message to President Buchanan by the cable, and that he in return had sent one to the royal lady by the same source, still many persons have not only doubted that such messages were ever sent, but a pamphlet was published last year in Boston containing very powerful arguments to prove that these messages came and went by a *steamship*, and that the whole of the reported cable telegraphing was "bogus." This question has at last been fairly investigated and settled in England in favor of the Atlantic Cable having really exhibited some signs of speech.

An action was lately brought by Mr. J. Patterson, in the Court of Queen's Beneh, against an underwriter named C. Harris, on a policy of insurance, by the terms of which the plaintiff was to be protected against all risk accruing to him as the holder of one share of the Atlantic Telegraph Company, through the cable suffering injury or its successful laying down being prevented by the perils of the sea. The plaintiff proved that the cable was injured, and that this being the case, it could not be called "successfully laid."

Professor Thomson, the electrician to the company, stated that between the 11th and 21st of August, 1858, the action was very good at certain hours; however, in general, its working was irregular. He was unable with certainty to account for that. The total quantity of cable manufactured was 3,290 miles, of which 2,135 were submerged, and about 370 lost. The cable submerged might be said to be lost, and the original capital entirely exhausted. Three days before landing at Newfoundland, they cut away sixty miles of the cable on board the *Niagara.* The conducting wire had got out of place, and had forced its way through the gutta-percha, so as almost to touch the wire covering. After that the signals were better. Before the cable was taken on board, it had been exposed for some time at Greenwich to the heat of a very hot sun, and there was no doubt that in that way some of the gutta-percha had got softened, and it oozed through the tow cover and outside wire.

Mr. Saward, the secretary to the company, proved that 20,000 words passed backwards and forwards between the two countries during the three weeks the cable worked. An expedition had been fitted out to take up the forty-six miles of the cable nearest Newfoundland. The new cable would start from a spot nearer to Europe by that distance. It was thought that portion of the cable had sustained an injury, and that the principal injury sustained was about 150 miles from Valentia. It was likewise thought that when those portions of the line were renewed, the whole cable would work. It was intended to raise two hundred miles at the Valentia end. There was no doubt that a portion of the gutta-percha had oozed through at Greenwich, in consequence of its having been melted by the heat of the sun. The cable had not been tested under water, in consequence of the fears of some of the directors that the strands of wire would get rusted. However, subsequent experience proved the desirability of a cable being submitted to such a test.

No evidence was called on behalf of the defendant, but the contention on his part was that the transmission of 20,000 words proved that the cable was fully laid down; and even if that were not granted, its complete laying down was not prevented by the perils of the sea, but through either its original defective organization, or the injury which it sustained by exposure to the sun at Greenwich, and which was previous to the time when the risk of the underwriters commenced. The jury found that the cable, owing to its exposure at Greenwich, was in a defective condition when placed on board, and that its defects were aggravated by the action of the sea water. It is understood that a vast number of cases depend on the fate of this one.

THE EMERALD.—This is one of the most beautiful natural gems. It is of a deep green color, and large stones of vivid luster are of great value. An emerald of four grains weight sells for about $20; one of 16 grains is valued at $200; and one of 48 grains at $1,000. As this gem is easily imitated, it requires a connoisseur to judge of its quality and value.

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THE CONDUCTIBILITY OF METALS AND THEIR ALLOYS FOR HEAT.

Translated from Dingler's Polytechnic Journal, expressly for the Scientific American.

[Concluded from page 38.]

The influence of a small quantity of impurities mixed with certain metals is very important, and we have found, by the aid of our apparatus, that one per cent of one metal mixed with another produces a singular change in the conductibity. With gold and silver the following results have been obtained:—

	Increase of the heat of the water in the smaller case.	Conductibility. Silver, taken as 1000.
Pure gold	56.3	98
Gold with one percent of silver	48.2	840

The addition of one per cent of silver (the best conductor) to gold reduces the conductibility of the latter nearly 20 per cent.

The conductibility of pure mercury is 38.9; and if the same is mixed with 1.25 per cent of tin, its conductibility is reduced to 23.67. In regard to copper it was quite recently found by Professor Thomson that a small quantity of another metal, mixed with copper, produces a considerable change in its conductibility for electricity. The results obtained in regard to the conductibility of copper for heat correspond exactly with those obtained for its conductibility of electricity, and it appears that some metals increase and others reduce this quality.

We have also investigated the influence of carbon on the conductibility of the iron, and the results may prove of some importance for manufacturing purposes. These results are as follows:—

	Increase of the heat in the smaller case.	Conductibility. Silver, taken as 1000.
Bar iron	25.5	436
Steel	22.8	397
Pig iron	20.6	359

A large number of experiments have proved that the conductibility of the alloys is considerably modified by the system of crystals to which each of the metals belongs, or by the particular formation of their own crystals. Some of the crystalized alloys of copper and tin, and of copper and zinc, are found to have a peculiar conductibility. For instance:—

Equivalents.		Found By exp.	Found By calc.	Silver, taken as 1000 By exp.	Silver, taken as 1000 By calc.
1 Tin	38.21	28.35	38.43	494	670
3 Copper	61.79				
	100.00				
1 Tin	34.73	8.91	39.33	155	686
4 Copper	68.27				
	100.00				

On the other hand, those alloys which show little or no crystallization, conduct the heat in proportion to the relative equivalents of the metals from which they are composed. For instance:—

Equivalents.		Found By exp.	Found By calc.	Silver, taken as 1000 By exp.	Silver, taken as 1000 By calc.
1 Lead	36.99	21.51	21.33	375	372
3 Tin	63.01				
	100.00				
1 Lead	30.56	21.96	21.89	381	381
4 Tin	69.44				
	100.00				

Conductibility of the Alloys of Copper and Zinc.

		Found By exp.	Found By calc.	Silver, taken as 1000 By exp.	Silver, taken as 1000 By calc.
Copper	49.32	39.51	41.22	688	718
Zinc	50.68				
Copper	32.74	24.57	39.41	428	687
2 Zinc	67.26				
Copper	24.64	20.51	38.61	531	672
3 Zinc	75.36				
Copper	19.57	33.94	38.07	589	663
4 Zinc	80.43				
Copper	16.30	34.20	37.71	595	657
5 Zinc	83.70				

From the foregoing tables it appears that the conductibility of the metals depends on the following points:—

1. On the disposition of the moleculos. The conductibility is greater with rolled than with cast metals. We find that the conductibility of rolled copper is 845, and that of copper when cast, 811.

2. On the crystallization. A bar of zinc, cast vertically, has four axes of crystallization, and its conductibility is 628; while a bar of zinc cast horizontally has only one axis of crystallization, and its conductibility is 608.

3. On small quantities of heterogeneous substances. One part of silver (the best conductor of heat) added to 99 parts of gold, reduces the conductibility of the latter from 981 to 840. The addition of carbon, arsenic, or some other non-metallic substance, produces similar results. Thus, the conductibility of silver being taken as 1000, that of bar iron is 436; steel, 397; pig iron, 339; fused copper, 811. The same with the addition of .25 per cent of arsenic, 771; .50 per cent of arsenic, 669; 1 per cent of arsenic, 570.

According to our experiments, therefore, the alloys may be divided into three classes. Those of the first class conduct the heat according to the relative equivalents of the metals from which they are composed. For instance:—

Composition according to the equivalents.		Conductibility By exp.	Conductibility By calc.	Silver, taken as 1000 By exp.	Silver, taken as 1000 By calc.
5 Tin	73.97	22.05	23.14	385	286
1 Lead	26.03				
4 Tin	69.44	21.87	21.78	381	381
1 Lead	30.56				
3 Tin	63.01	21.51	21.33	375	372
1 Lead	36.99				
2 Tin	53.18	20.07	20.07	350	350
1 Lead	46.82				
1 Tin	36.22	18.98	19.08	330	331
1 Lead	63.78				
1 Tin	22.11	18.00	18.68	313	314
2 Lead	77.85				

To the second class belong those alloys which contain a larger number of equivalents of the good conductor than of the bad conductor, such as 1 copper and 2 tin, 1 copper and 3 tin, 1 copper and 4 tin. Those alloys conduct the heat just as if they did not contain a particle of the good conductor, for they show the same conductibility as if the prismatic bar consisted simply of the bad conductor:—

Conductibility of the Alloys of Tin and Copper.

Composition according to the equivalents.		Conductibility By exp.	Conductibility By calc.	Silver, taken as 1000 By exp.	Silver, taken as 1000 By calc.
Copper	34.98	23.85	32.04	415	558
Tin	65.02				
Copper	21.21	24.21	28.93	431	504
2 Tin	78.79				
Copper	15.21	23.94	27.54	423	481
3 Tin	84.79				
Copper	13.71	23.49	26.82	406	468
4 Tin	86.29				
Copper	11.86	22.77	26.37	396	459
5 Tin	88.14				

All the above alloys give nearly the same result, as if they contained nothing else but tin, notwithstanding the first one contained nearly 35 per cent of copper.

The alloys of the third class consist of metals similar to those of the second class, but they contain a larger quantity of the good conductor than of the bad one. The conductibility of these alloys increases gradually until it reaches that of the good conductor:—

Conductibility of the Metals.

Metals.	Temperature of the 3 cubic inches of water at beginning of the experiment.	Temperature of the 3 cubic inches after 15 minutes.	Conductibility as found by each experiment.	Mean conductibility.	Conductibility compared with silver, taken as 1000.
Pure silver	67.6	124.9	57.3	57.5	1000
	67.4	123.1	57.7		
Pure gold	57.2	113.7	56.5	56.3	981
	56.5	112.6	56.1		
Gold of .991	68.5	117.1	48.6	48.3	840
	68.5	116.6	48.1		
Copper rolled	68.0	116.8	48.8	48.7	845
	69.8	118.4	48.6		
Copper cast	70.7	116.9	46.3	46.1	811
	70.6	117.0	46.4		
Mercury	59.0	98.1	39.1	38.9	677
	61.9	100.6	38.7		
Aluminium	64.7	102.7	38.0	38.1	665
	63.8	102.0	38.2		
Zinc rolled	65.1	102.0	36.9	37.0	641
	67.1	104.3	37.2		
Zinc cast vertically	65.6	102.4	35.8	36.8	638
	57.2	95.0	37.8		
Cadmium	64.4	97.7	33.3	33.1	577
	61.7	94.6	32.9		
Bar iron	65.7	90.7	25.0	25.05	436
	66.3	91.4	25.1		
Tin	68.9	93.2	24.3	24.2	422
	70.2	94.3	24.1		
Steel	59.3	82.0	22.7	22.75	399
	58.9	82.7	22.8		
Platinum	59.0	80.8	21.8	21.9	377
	57.2	79.2	22.0		
Natrum	57.4	78.3	29.9	20.95	365
	57.6	78.6	21.0		
Pig iron	58.1	79.5	21.4	20.9	359
	60.1	80.6	20.5		
Lead	68.9	85.4	16.5	16.6	287
	64.3	81.5	16.7		
Antimony cast horizontally	58.3	70.7	12.4	12.35	215
	57.7	70.0	12.3		
Antimony cast vertically	66.6	77.5	10.9	11.0	192
	66.0	77.1	11.1		
Bismuth	66.2	70.0	3.8	3.6	61
	64.9	68.3	3.4		

RATS VS. LEAD PIPES.—A correspondent writing to us from Liverpool (England), thus refers to the above subject:—"Your correspondent 'W.G.,' of Md., (in the number for June 2d) will no doubt be pleased to hear that we consider refuse lime, obtained from the purifiers of gas works, when laid under the pavement, a preventive to rats, as they will not burrow in or near it. We are obliged in offices here to put a convenient place near the cistern for the rats to get water at, or they eat our lead pipes through without fail; we have had several so eaten. I have one piece of 1¼ inch pipe, with a hole in it 2½ to 3 inches long, and ¼ to ½ an inch wide, the edges of which show well by what means it came there, having marks of teeth all around; it has caused us great damage to the ceilings by the water."

OF all the substances known, silver is the best conductor of electricity, and the diamond is the best insulator. Silver is also the best conductor of heat.

A COLUMN OF VARIETIES.

In Albany (N. Y.) the gas-light company of that city charges from $1.80 to $2.40 as an annual rental for meters. This tax is held to be exorbitant. Upon the same principle of taxation, grocers should claim a tax from their customers for the use of their weights and measures employed to weigh and measure butter, cheese or potatoes.

The first attempt to employ females as type-compositors in London has lately been made in an office called The Victoria Printing Press, which was established in March last. It is stated to have been attended with success.

At the great rifle-shooting match lately held at Wimbledon (near London), with prizes open to the riflemen of all nations, Queen Victoria fired the first shot and sent the bullet right into the bull's eye. All things were nicely adjusted, with the rifle held in a vise, to obtain this result. About 150 "crack" Swiss riflemen were present; but the first prize was taken by an Englishman from among several thousands of contestants.

The process of thoroughly extracting all traces of writing ink, whether accidentally spilt or written in error, is to alternately wash the paper with a camel hair-brush dipped in a solution of cyanuret of potassium and oxalic acid; then, when the ink has disappeared, wash the paper with pure water. By this process checks have been altered when written on "check paper," from which it was supposed impossible to remove writing.

Holtzapffel, in his work, relates an example of intricate chain casting executed by a German workman, at the Hayle Foundry, in Cornwall. Its length was nearly five feet; it was made of 180 links, and weighed a little more than 1½ ounces.

The discovery of a "perfect mine of antique art treasures" in some mounds outside of the old Armeno-Assyrian city of Van is described in several of our foreign exchanges. A couplo of peasants were engaged in digging out some loose stones from the mounds in question, when they came, first upon one, and then a second bronze plate, thickly embossed with cuneiform inscriptions, interspersed with rude, angular figures of men and animals. The pasha then dispatched a party of explorers to the mounds, and the result of a few days' search was the discovery of a splendid bronze human-headed bull, about three-quarters-life size, a large winged eagle, and two elaborately-carved serpents, all in the purest bronze.

According to the Scottish law, all mineral poisons, and especially arsenic, are required to be triturated with a small quantity of inert Prussian blue, which, when ejected from the stomach, suggests suspicion by its unerring color. It may not be remembered by all that the cause of the death of D'Angelier (who was supposed to have been poisoned by Madeline Smith) was discovered by this indication. The Prussian blue is exceedingly diffusive, and, if thoroughly mingled with the poison, will indicate the presence of the smallest quantity. The English law provides that poisons kept for sale by apothecaries shall be stored in a closet by themselves, the inclosure being distinctly labeled. This prevents mistakes and the possibility, for instance, of selling arsenic for magnesia—a fatal error which has often occurred. It also directs the attention of all in the shop, when the closet is opened, and if the person opening it is inexperienced or unauthorized, this would lead to a supervision of his movements.

The principal constituents of milk are cream or oily matter, casein or cheese, sugar, saline matters and water. The proportion of each is variable in different milks, but it may be stated, as a general rule, that milk which presents more than 87 per cent of water is of inferior quality; on taking the average proportion of this ingredient according to the different analyses, it is found to be 86.8 per cent. If 87 per cent be assumed as the standard, a very simple process will, in many cases, be sufficient to detect the degree of dilution to which the sample has been subjected by fraudulent persons. Evaporate 100 grains to dryness; ascertain the loss, from which deduct 87; the difference, then, multiplied by 100, and divided by 13, will give the per-centage of added water, thus:—Suppose 100 grains to lose, on evaporation, 89.6 grains; then 89.6—87=2.6, and 260 divided by 13 gives 20 per cent of added water.

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THE PROGRESS OF PHOTOGRAPHY—THE "INSTANTANEOUS PROCESS."

The following process (described in *Humphrey's Journal of Photography*, by L. M. Dornach) is said to be capable of taking the most exciting scenes of life with perfect distinctness:—"It is always desirable that the photographer should have at his command the means to take that limited class of pictures or views in which there are moving objects—such as street views, vessels in motion, &c. For this object, different methods, called 'instantaneous processes,' have been devised. The following is one that has never been published, and gives very good results:—'The first thing to be done is to make a very sensitive alcoholic collodion, as follows:—To 4 fluid ounces of sulphuric ether (sp. gr. ·720), add 4 fluid ounces of 95 per cent alcohol; in this, dissolve 140 grains of soluble cotton made in rather weak acids, so that it has a short structure, and, when all dissolved, add 12 fluid ounces more of alcohol which finishes the plain collodion. To 20 ounces of this collodion, add 2 fluid drachms of a saturated solution in water of iodide of potash and 30 grains of bromide of cadmium; allow the undissolved particles held in suspension to subside, and the collodion is complete. Use a neutral 45-grain nitrate of silver bath: develop with water, 16 ounces; protosulphate of iron, 1 ounce; acetic acid (No. 8), 1 ounce; alcohol, 1 ounce. Fix the picture, as usually done, with cyanide of potassium. When the picture has been thus far complete, it lacks the required degree of intensity for a negative, and the following method is resorted to for this object:—After it has been fixed and well-washed, pour over the plate a saturated solution of bi-chloride of mercury, after which wash the plate well; then pour over it some water in which 2 or 3 grains of iodide of potassium or iodide of ammonium (which is the best) have been added to the ounce, when the plate is to be again well-washed. If the intensity is not sufficient, this process is repeated until the required intensity is obtained."

$1,000 REWARD—A FLYING MACHINE WANTED!

The undersigned believes that aerial locomotion is possible for man as well as bird, when substantially the same conditions and arrangements are observed. The above sum is offered for a practical flying machine adapted to individual locomotion, and will be paid on the 1st of September, 1861, to the inventor who, at that time, shall produce the best machine for flying. The undersigned calls the attention of inventors to the fact that all creatures that fly accomplish it by the exertion of mere animal force. Whatever advantages the inhabitants of the air may possess by nature over man may be more than matched by his ingenuity and skill. Let the inventors of the world no longer stumble on the threshhold of the grandest fact in the progress of the race by listening to absurd theories. *Flying is possible for man!* This offer is open to the inventors of all nations. THADDEUS HYATT.

New York, July 25, 1860.

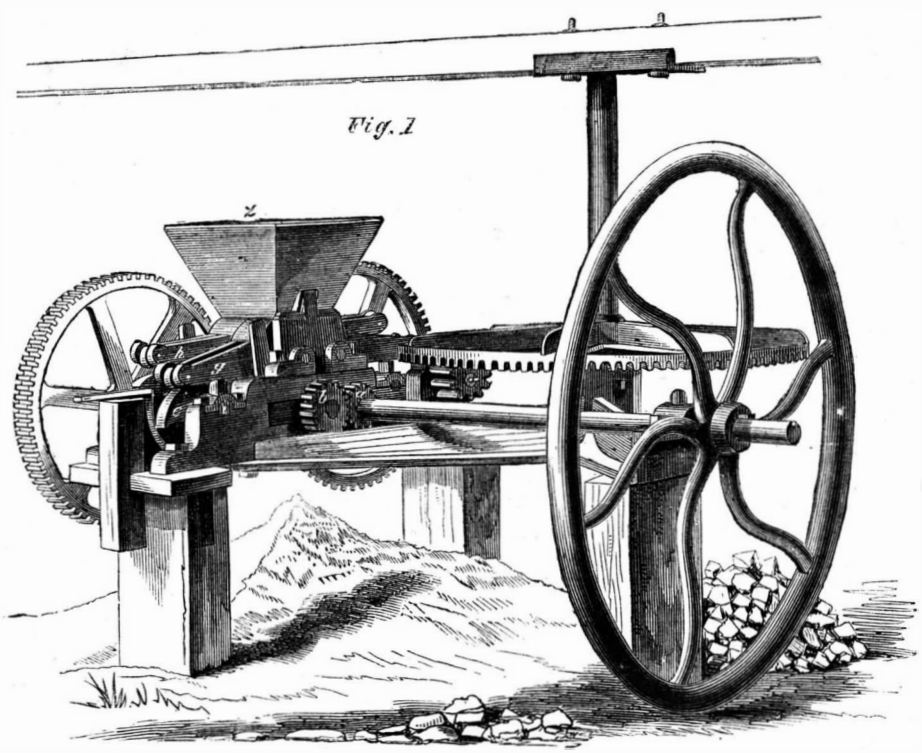
[Mr. Hyatt is a well-known inventor of this city, and having one patent that is paying him a revenue of many thousand dollars a year, is undoubtedly responsible for the prize if the conditions are fulfilled.—EDS.

Gas-works are increasing rapidly throughout every section of our country. In Natick, Mass., a company has been formed for the erection of gas-works in that place, and they are expected to be in operation by the 1st of November next. In Quincy, Mass., and Ellsworth, Maine, new gas-works are in the course of erection.

IMPROVED QUARTZ-CRUSHER.

Persons who witnessed the feverish excitement that followed the discovery of gold in California find it difficult to realize that the crushing of auriferous quartz is to be hereafter an established and permanent industry—as much so as weaving cloth or grinding grain—that, when the country becomes old and conservative, children will be reared in luxury on the products of their fathers' mines, which they will inherit, and the business will be transmitted from generation to generation for hundreds of years. And yet there can be no doubt that such is to be the case. Improvements, therefore, in quartz-crushing machinery are of as permanent value as those in any department of mechanism.

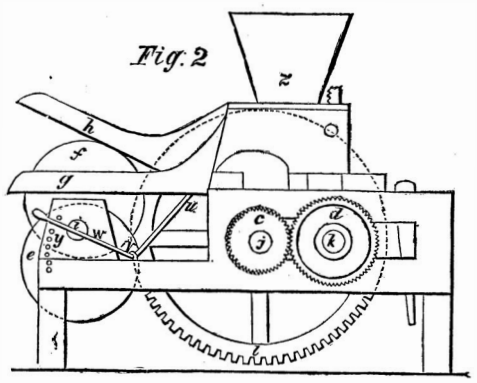
Fig. 1



DU BOIS'S PATENT QUARTZ-CRUSHER.

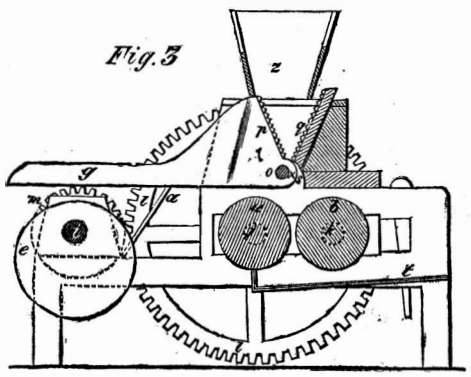
The invention here illustrated relates to that class of machines in which the rock is first crushed between jaws

Fig. 2



and then ground between two rollers. The quartz rock is placed in the hopper, *z*, from which it falls down in suitable quantity between the jaws, *p* and *q*, one of

Fig. 3



which (*q*) is stationary, while the other (*p*) has a vibratory motion around its pivot, *o*. This motion is produced by an eccentric, *e*, which revolves under the lever, *g*, raising it up and forcing the jaws together with great power. The quartz, after being thus crushed, falls down between the rollers, *a* and *b*, one of which (*b*) is driven by a large gear wheel upon its shaft which meshes into a smaller driving wheel upon the shaft of the roller, *a*. This, of course, causes one roller to revolve more rapidly than the other, producing a rubbing, in addition to the crushing, operation upon the quartz. The extent of the motion of the jaw, *q*, is limited and regulated by the support, *u*, upon which the lever, *g*, rests; this support being pivoted at *v*, and rigidly fastened to the handle, *w*, so that it may be turned at a greater or less angle, when it is place by the pins, *y*.

In order to make the resistance of the machinery to the power more uniform, it is better to have two pairs of jaws (as represented in Fig. 2), so arranged that one of those which vibrate will be advancing towards its fellow while the other is opening, and *vice versa*.

The opening, *s*, in the bottom of the hopper, for the escape of the broken stone, is not directly downward, but is curved backward from a vertical line, as shown in Fig. 2. It is also placed back of the pivot, *o*; and this arrangement, together with its curved form, operates to prevent the escape of large flat pieces of quartz until they are thoroughly broken. This is one of the essential features in this invention.

The stationary jaw, *q*, is arranged in grooved ways in the machine, so that it may be adjusted in a higher or lower position, and thus the size of the opening, *e*, maybe regulated at pleasure.

The patent for this invention was procured (through the Scientific American Patent Agency) on June 26, 1860; and further information in relation to it may be obtained by addressing the inventor, F. N. Du Bois, at Chicago, Ill.

AN INGENIOUS PIECE OF WORK.

We find the following account of a remarkable instance of patient labor in a recent number of the *Philadelphia Ledger*:—Mr. Nicholson, a journeyman carpenter of this city, has just completed a *fac-simile* in miniature of the National Washington Monument. The miniature contains 6,480 pieces of wood of American trees. It is built on a scale of one-eighth of an inch to a foot, and completed it stands 5 feet 8¾ inches high. The base is composed of 3,681 pieces, arranged as a tesselated pavement. The wood in this portion of the structure includes white oak, walnut, oak from the frigate *Alliance*, red cedar, and ash. The pantheon is composed of 308 pieces, consisting of live oak, walnut, cherry, red cedar, boxwood (from the Patterson farm at New Jersey), maple, mulberry, buttonwood, Pennsylvania ironwood, white oak, cherry, plum, and wood from the frigate *Alliance*. There are 28 anti-columns of cherry and walnut, with thin caps of cherry. So on with the other portions of the edifice, the woods used including apple, beech, chesnut, cherry, ash, boxwood, buttonwood, elm, (treaty elm), gum, walnut, hackinkack, locust, spruce, plain maple, bird-eye maple, paper mulberry, red cedar, poplar, white pine, yellow pine, white oak, live oak, mulberry, and wood from the charter oak, the treaty elm, wood from the frigate *Alliance*, the ship *Constitution*, wood from Fort Du Quesne. The star at the top of the obelisk is made of a piece of the old Independence bell. The whole is most neatly joined, over three years having been occupied with the work. As the model now stands, it carries out the same design in wood as is proposed to be carried out in marble by the erection of the National Washington Monument. If the SCIENTIFIC AMERICAN'S definition of ingenuity is right, viz., that it is "a very complicated combination of devices to produce a result that is not very useful," Mr. N.'s piece of work is very ingenious.

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VOL. III., No. 6.....[NEW SERIES.]....*Sixteenth Year.*

NEW YORK, SATURDAY, AUGUST 4, 1860.

THE SEVEN WONDERS OF THE WORLD—AND THE LAST.

THE *Great Eastern* has been called "the eighth wonder of the world," but a brief comparison with the others and a consideration of the several elements which enter into its structure will show that it is a far greater wonder than any of the marvels of early days. The seven great works which so excited the admiration of the ancients that they called them "wonders of the world" were as follows:—

1st—The Egyptian Pyramids. The largest of these is 693 feet square and 499 feet high, and its base covers 11¼ acres of ground.

2d—The Mausoleum, erected to Mausolus, a king of Caria, by his widow, Artemisia. It was 63 feet long and 35 feet high.

3d—The Temple of Diana at Ephesus. This was 425 feet in length and 220 feet in breadth.

4th—The Walls and Hanging Gardens of Babylon. These walls are stated, by Herodotus, to have been 87 feet thick, 350 feet high, and 60 miles in length; and this statement is deemed credible by modern antiquarians.

5th—The Colossus of Rhodes. This was a brazen statue of Apollo, 105 feet in hight, standing at the mouth of the harbor of Rhodes.

6th—The Statue of Jupiter Olympus, at Athens, which was made of ivory and gold, and was wonderful for its beauty rather than for its size.

7th—The Pharos of Ptolemy Philadelphus. This was a light-house 500 feet high, on the island of Pharos at Alexandria, in Egypt. A fire of wood was kept burning on its summit during the night, to guide ships to the harbor.

As mere masses of matter, a small mountain surpasses any or indeed all of these works combined, and of course, the only reason why they excite our admiration or interest is in the circumstance that they are the work of *our race*; they are splendid triumphs of human intelligence and power. But in this point of view how completely they sink into insignificance when compared with the *Great Eastern* steamship! How vast is the mass of accumulated knowledge that has been used in the construction of this fabric! It is said that $500,000 were expended in experiments to determine the proper thickness of the iron plates to be used in the several parts of the Menai Bridge; and that bridge was very literally the harbinger of the *Great Eastern*. But these experiments furnished but an inconsiderable fraction of the knowlege of materials which has been employed in this structure. The engineers would have deemed it an unpardonable neglect for them to have been ignorant of the results of any of the numerous experiments which have been made in various parts of the world to test the strength or any of the properties of any materials which might possibly have been used in any part of the fabric. None but those familiar with inventions in this department can form any idea of the immense amount of study and experiment which have been devoted to the smelting, the hammering, rolling, heating, bending, punching and shearing of iron. With all this accumulated knowledge, how great was the mental labor required to determine the form and dimensions of every one of the numerous beams, and of the thousand plates in this ship! Such would be the comparison of the great vessel with other works, if she were to remain stationary on solid foundations; but the 12,000 tuns of iron of which she is composed are destined to *float* on the liquid ocean; she is to plow her way through the billows, to rise and fall with the tide, and to pass her life as a drop of the sea! It is in the knowledge and thought which have been combined to produce and direct this motion, that the *Great Eastern* leaves the works of ancient wonder entirely out of comparison. In order to determine the size of the boilers, conducting pipes, valves and air-pumps, how numerous, careful and laborious have been the experiments upon the evaporation of water, the pressure of steam at various temperatures, the absorption of incondensible gases by water, and the hundreds of other matters which we have not space even to enumerate.

The perpetual interest and wonder excited by the *Great Eastern* is in the vast volume of embodied thought that is embraced by her iron ribs. And yet all this is surpassed by the knowledge of the stars which are to direct her course. How enormous has been the amount of intellectual labor, devoted by the greatest minds that the world has ever known, to those investigations of astronomy which have brought the art of navigation to its present state of perfection! In the bold genius which conceived the enterprise—in the long accumulations of money which furnished the capital—in the acquisitions of knowledge and grasp of mind which planned her complicated structure—and in the sublime science which, by observation on the distant heavenly bodies, is to guide her pre-determined way over the pathless ocean—the iron ship which now lies at the foot of Hammond-street, in this city, is the greatest conquest of intellect over inanimate matter and the blind forces of nature that has ever been achieved by the human race.

METEORS—WHAT ARE THEY?

There is no room left for reasonable doubt that meteors, such as the one which passed over this city on the evening of the 20th of July, are small planets, rushing through space and probably revolving around the sun. Of the several explanations which have been suggested, no other has the slightest degree of plausibility, while this is in accordance with all the facts and is confirmed by every new observation. There are records of the appearance of hundreds of these bodies, large numbers of them having exploded and sent fragments to the ground. It is estimated that the one which passed over Ohio on the 21st of April last, was three-eighths of a mile in diameter. Of the several fragments which it cast to the earth, the largest weighs 103 pounds, and others 40 and 50 pounds apiece.

The one which passed over this city on the 20th ult., will be forever memorable in the history of these remarkable bodies. In the first place a better account will be procured of it than has been obtained of any of its predecessors. It appeared in the evening of a clear night when it was most likely to be seen—it passed at a great hight so that it was visible over a wide area—and it came within the observation of the most intelligent community in the world. There is hardly a village from which it was seen that does not contain one or more persons competent to collect the testimony from the spectators, and thus ascertain its distance from the zenith at its greatest elevation. From these numerous and scattered observations its distance from the earth will no doubt be ascertained with a degree of accuracy which has never before been equaled, and a judicious sifting of the testimony will probably permit a pretty close estimate of its size. From the best accounts that we have yet seen, we calculate its hight at 38 miles, and its size at a little more that three-fourths of a mile in diameter, but these results are to be verified by comparison with all the other statements. It was probably the largest meteor that has ever been seen.

If the statement of its zenith distance, given in the Providence *Journal*, is correct, it would seem to have been rapidly approaching the earth, and may have fallen either into the Atlantic Ocean or upon the continent of Africa. People have been repeatedly hit and killed by the falling fragments as they struck the earth: and if the whole mass of one, half a mile in diameter, should hit a great city in its diagonal descent, what awful havoc it would make! The danger of this calamity it is true is very small indeed, but if one of our elderly real estate owners could have seen this huge mass of matter of the 20th, when it was a million of miles away on its apparently straight flight exactly towards us, he would have thought that it was pretty close shooting, and would probably have drawn a long breath when it had passed. It will be remembered too, that this is the second of these flying rocks that has passed directly over the city within a year. The one of the 15th of November, 1859, would have attracted as much notice as the last had it passed in the evening instead of at half-past nine in the morning. Its light was so intense that it made a bright flash in the clear sunlight, and its explosion over the southern part of New Jersey was mistaken for an earthquake.

If the meteor of the 20th did fall into the Atlantic Ocean, the effect ought to have been observed in the self-acting tide registers of the Coast Survey, if in no other way.

It has been supposed, heretofore, that the heat of these little planets was produced by the resistance of our atmosphere as they traversed it with their immense velocity; though such rough observation as has been made of several would seem to indicate that they became luminous and exploded beyond the limits of our atmosphere. As these explosions were accompanied, however, by loud reports, which it was impossible to believe could have been propagated where there was no air or other medium, a natural suspicion was thrown on the accuracy of the observations. This discussion causes great interest to attach to the problem of ascertaining positively the hight of these bodies above the earth, and makes it desirable that all spectators who chance to see one should make the proper observations for this purpose.

The most important of all circumstances to be carefully noticed when a meteor is seen, is either its distance from the zenith, or its distance above the horizon, at its greatest elevation. This may be obtained with considerable accuracy whenever the meteor chances to come in a line with any terrestrial object, such as a tree or building, by noting exactly the part of the object with which it ranges and carefully remembering this, to be measured with instruments afterward. A person who knows the principal stars may adopt a still better plan, by observing the stars which it passes in its flight, especially at the point of its greatest elevation above the horizon. This is the most valuable of all observations of meteors which can be made, for if only two such are made at the same distance on each side of the meteor's track, they will give its hight from the earth with accuracy and certainty. If the size is given as compared with any terrestrial object, as a man's hat, the apparent distance from the earth in feet or miles should accompany the statement, as the former without the latter has no meaning. The time of day, the direction of flight, the color, and everything connected with the startling phenomenon should also be noticed coolly and accurately, carefully written out, and forwarded either to the SCIENTIFIC AMERICAN, *Silliman's Journal*, Professor Henry, of the Smithsonian Institute, or to the nearest college. In this way the American people will contribute their share towards obtaining a full knowledge of these mysterious bodies which so frequently come in close proximity to the earth, or in actual contact with it, in their swift flight through space.

SELF-ACTING CONTINUOUS RAILROAD BRAKES.

On page 40 of the present volume of the SCIENTIFIC AMERICAN we published an illustrated description of a self-acting continuous brake for railroads, by which all the cars in a train could be arrested by the engineer without the assistance of brakemen. A case has lately been decided in England, in which the value of such a brake is made evident to our minds. On the 30th of May last, an excursion train (consisting of 35 carriages), on the Great Northern Railroad, returning from Liverpool, when it came to the London terminus, instead of stopping, dashed along at full speed through the station and actually leaped on the platform at the end of it, a hight of six feet, carrying with it the tender and two carriages, and, proceeding on its fearful and precipitous course, ran down the inclined plane, immediately under the dock, and across the old St. Pancras road, where it burst through the inclosure of the Metropolitan Railroad

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Works. The engine, tender and brake were completely destroyed, and the other carriages more or less injured. Many of the passengers sustained serious wounds and contusions. It was found that the guard had firmly applied the first brake, but the second brake showed it had only been partially applied. It was then discovor d that the guard was in a state of intoxication, and he was taken into custody. One of the sufferers in this case has obtained damages amounting to about $13,000. The brake to which we have referred, had it been on this train, could have been applied effectually by the engineer, altogether independent of the drunken brakesman.

THE AMERICAN ENGINEERS' ASSOCIATION.

On Monday evening, July 18th, the fifth monthly meeting of this association was held at its room in the Cooper Institute, this city; H. E. Rhoeder, chairman *pro tem.*; John C. Merriam, secretary.

After the transaction of considerable miscellaneous business, the members proceeded to the examination of some

NEW INVENTIONS.

Improved Cut-off.—Mr. Hopper exhibited what he considered an improvement on the Stevens cut-off. The peculiarity and advantage of this cut-off is that it is successful in lifting the valve more rapidly than all others, and that it can be easily changed while the engine is in working condition. Mr. Hopper affirmed that the Stevens cut-off was never properly adjusted, excepting in one instance, on the frigate *Mississippi*, and that he regarded in the light of an accident.

Anti-pressure Valve.—Mr. Beech exhibited what he considered an improved valve for locomotives. The great advantage claimed was, it was so peculiarly arranged that it had no weight bearing down upon it besides that of the pressure of the atmosphere, and that, in its application to the reversing of an engine, it would be superior to any in use. To demonstrate its utility, Mr. B. explained that experiments had placed him in possession of some facts, in relation to the power requisite to move the common long D-valve at different pressures, that were highly interesting. A force of 20 lbs. was required to move the valve without pressure; at the pressure of 60 lbs. steam, it required 1,350 lbs.; and at 100 lbs. pressure, it required 3,700 lbs. He said the valve by which the experiments were made possessed an area of 9½ by 17 inches.

Both of these inventions were referred to the appropriate committee, and, when reported upon, will receive further attention from us.

The subject of "Expansion" was then introduced, and the following is the *gist* of the

DISCUSSION.

Mr. Merriam—I have a question to ask the members, which is not to be answered to-night, but only upon mature reflection. It is this:—If steam, at 60 lbs. in a cylinder, be cut off at one-half stroke, what will be its pressure at the end of the stroke, not taking into consideration any loss for condensation or friction?

Mr. Koch—I presume the gentleman means this as a theoretical question. I consider it one of some importance, and hope the members will earnestly ponder upon it, and give us, at next meeting night, the results of their individual deliberations.

Mr. Merriam—It is a purely theoretical question.

Mr. Beech—For the information of members, I will state what I am confident is a fact, my observations extending through a series of 10 years. If you have 40 lbs. of steam in a locomotive boiler, the water occupying a space equal to one-half its cubic contents, and you blow-off this water, you will, upon examination, find from 25 to 30 lbs. of steam remaining after the entire body of water has been run out.

Mr. Montgomery—I have had occular demonstration that when the cut-off of a locomotive engine was used, the speed of the engine would instantly increase, and again diminish when taken off.

Mr. Beech—I coincide with Mr. Montgomery in this particular, as it is proved to me almost every day.

A remark was made that the Polytechnic Association had approved of the results arrived at in the late experments at the Metropolitan Mills, where it is claimed that cut-offs are useless appendages, which remark called forth—

Mr. Johnson—In behalf of the Polytechnic Association, I disclaim the assertion that the society has accepted the idea that cut-offs are of no value. The association have merely referred the question to a special committee, who will report at the first meeting in September.

After a few more unimportant remarks, the meeting adjourned.

RECENT AMERICAN INVENTIONS.

The following inventions are among the most useful improvements patented this week. For the claims to these inventions the reader is referred to the official list on another page:—

SEPARATOR.

This invention relates to that class of machines for scouring, cleaning and separating grain from impurities, and also detaching and separating the hulls therefrom, in which the fan is used to produce an exhaust or suction blast. This class of machines as heretofore constructed are imperfect in many respects. First, the scouring devices have been so arranged as to operate in a very inefficient manner, some grains or kernels escaping the action of the scourer, while others would be subjected to an undue action of the same, and be bruised or broken. Second, the use of materials contrived or arranged in such a way as to produce bad results, as for instance the employment of French burr stone for a scouring surface, without the employment of suitable flues to carry off the dust and prevent clogging or choking. Third, a defect in the arrangement of the air-passages, whereby the blast is made to act in an inefficient manner in passing through the machine. Fourth, due provision not being made for the taking of the machine apart so as to render all parts accessible for the ready repairing and cleansing of the same, and to facilitate transportation. The object of this invention is to obviate these difficulties by a simple, durable and economical machine, the credit of which is due to A. J. Vandegrift, of St. Louis, Mo.

TERRESTRIAL GLOBES.

James Monteith, of New York City, has just received a patent for an invention designed to aid teachers in explaining the influence of the attraction of gravitation, and this invention consists in the employment in combination with a terrestrial globe, of one or more figures attached to the center of the globe, each with an elastic cord or spring of proper length to pass through the shell and hold the figure against the outer surface of the globe.

Simultaneously with the above patent, the same inventor has received another for a mode of constructing either a terrestrial or celestial globe in hemispheres, hinged together in such a manner as to be capable of being thrown open for the exhibition of the world or firmament in the hemispheres side by side, or closed for the exhibition of the world in its natural condition, or the firmament as a perfect sphere at the pleasure of the teacher. It also consists in a certain mode of combining a suspending cord with the so-divided globe whereby it may be suspended either in an open or closed condition and kept in either condition by means of the said cord.

PUNCHING MACHINE.

This invention relates to certain improvements in machines for punching metal plates, and is more especially designed for making hoop locks, for connecting or fastening the ends of metal bale hoops. The invention, however, may be applied to all punching machines, and will be useful in all cases where metal is operated upon by punches. The invention consists in a novel means employed for compensating for the wear of the dies, whereby the usual trouble attending the raising and adjusting of the dies is avoided. The invention also consists in a peculiar means for rendering the punches inoperative without stopping the driving shaft of the machine, and thereby facilitate the manipulation required in presenting the work to the machine. The inventor of this improvement is Charles Hughes, of New Orleans, La.

BRIDLE-BIT.

This invention has for its object the restraining or controlling of vicious horses and other animals which are used with a bridle and bit, by checking respiration. To this end there is made a bit of jointed cross bars, having at one end arms provided with buttons, which, when the bit is adjusted in the mouth of the animal, will be just above the ends of the nostrils; the opposite end of the cross bars having the reins attached. By this arrangement, the buttons may at any time, by pulling sufficiently hard on the reins, be made to bear on the nostrils of the animal and close them, thereby effectually checking respiration, and placing the animal under the complete control of the rider or driver. This improvement was designed by W. F. and W. R. Johnson, of Wetumpka, Ala.

MOLD FOR NEEDLE-THREADERS.

Needle-threaders, or devices for the purpose of facilitating the threading of needles, have heretofore been made of ivory, and the price of these neat and handy implements has been so high, that it has been impossible to sell them extensively and to introduce them amongst the poorer clases of the people where they are most needed. The object of this invention is to produce needle-threaders in such a cheap manner that the poorest seamstress can afford to buy one of them, and this invention consists in arranging a mold with sliding pointed pistons and with suitable cores and core-pins, in such a manner, that a needle-threader with all its recesses and holes can be cast, and that nothing remains to be done but to fasten a small metal plate in front of the threader in order to render it complete and ready for use. This device has been patented to S. S. Burlingame, of Warwick, R. I.

WATER METER.

The object of this invention is to arrange all the parts necessary to effect the change of the valve or valves in the interior of a closed cylinder so as to require no packing, and dispense with all the stuffing boxes, with the exception of one on the end that serves to operate the registering apparatus. With this object in view a single piston is arranged in the interior of a closed cylinder which contains a series of levers arranged in such a manner that the piston as it arrives at either end of the stroke, by pulling on or pushing against said levers, causes the valves to change. The levers are arranged on the principle of toggle arms, and they connect with the valves so that whenever the piston acts on the levers, the change of the valves is made instantaneously, thereby cutting off the water from one and admitting it to the other side of the cylinder. Four valves are used, which are secured to the same stem, and which perfectly balance each other. The inventor of this device is Gerard Sickles, of Roxbury, Mass.

WATCH.

We omitted last week to mention an ingenious improvement in watches &c., patented by O. H. Woodworth, of Coffeeville, Miss. This improvement consists in enclosing the movement of a watch or other time-keeper within a case which is permanently air-tight not only during the ordinary running of the movement, but while it is being wound up or regulated or having its hands set. The principal object of the invention is to exclude dust from the movement; but by producing a vacuum within the movement, the oil used for lubrication is prevented from becoming dry or gummy.

A Novel Method of Preserving Fish.—Mr. Brown, of Troy, N.Y., has discovered a rather novel and sure method of preserving fish, sweet, and with their original flavor, during the excessive heat of summer. He takes a large cake of ice, and after having bored a hole large enough to suit the purpose, he deposits the fish in it, and closes up the aperture made by means of a plug of ice. This shortly freezes, and makes the whole a solid mass, ready for transportation to any desired point. Fish preserved in this way will last for ten or twelve days, or as long as the ice will remain in an unmelted state. This method of preserving fish and game is of great use when they are about to be sent away, and will probably supersede the old method of packing in ice and sawdust.

Bread Excitement.—There is at present considerable excitement in Savannah, Ga., because of the refusal of the bread-bakers of that city to comply with a city ordinance which requires the City Treasurer, at the beginning of every month, to ascertain, from the best authority, the average price of flour in the city for the month previous, and thereby to regulate the size of bread for the month ensuing on such terms, in all instances, as shall secure a profit of $4.50 per barrel to the bakers. The bakers rebel against the enforcement of the law, and continue to make their loaves of the size which will give them the greatest profit.

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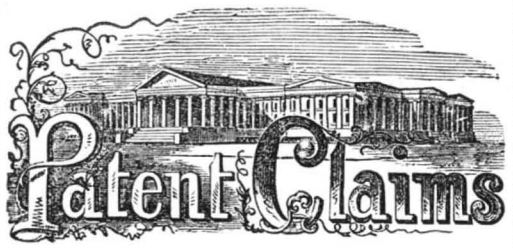

ISSUED FROM THE UNITED STATES PATENT OFFICE

FOR THE WEEK ENDING JULY 24, 1860.

[Reported Officially for the SCIENTIFIC AMERICAN.]

Pamphlets giving full particulars of the mode of applying for patents, size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

29,228.—A. B. Allen, of New York City, for an Improvement in Mowing Machines:

First, In combination with the pivoted shoe supporting the inner side of finger-bar, I claim the arrangement of the lever, F, and projection, c, in the manner substantially as and for the purpose set forth.

Second, In combination with the lever, F, operating as set forth, I claim the hand lever, I, the segments, H and H′, and chain, G, or its equivalent, the whole being arranged and operated in the manner substantially as and for the purposes set forth.

29,229.—J. R. Agnew, of Philadelphia, Pa., for an Improvement in School Globes:

I claim, first, The combination of the calipers, C C′, with the horizon, F, and hemispheres, H H′, as set forth.

Second, In combination with a concave hemisphere, the movable horizon, G, turning upon a universal joint at its center, said joint being supported upon the inner end of the semi-axial rod, L, passing through the cylindrical screw, Q, as and for the purpose described.

Third, The double-pointed zodiacal index, M, constructed and operating as described.

Fourth, I claim placing and operating an orrery, more or less complete, within a concave hemisphere or globe representing the celestial universe, substantially in the manner set forth.

29,230.—S. S. Burlingame, of Warwick, R. I., for an Improvement in Molds for Casting Needle Threaders:

I claim, as an improved article of manufacture, a mold for casting needle threaders, made and constructed as shown and described.

29,231.—J. A. Bradshaw and A. Frank Coley, of Lowell, Mass., for an Improved Punching Machine:

We claim, first, The shifting die, i n combination with the concentric punches, operated in manner substantially as and for the purpose described.

Second, The combination of the wedge, L, and punch, F, in manner substantially as and for the purpose set forth.

Third, We claim the double inclined plane, d, or equivalent, for the purpose and substantially as described.

Fourth, We claim the feed rolls, T T′, operated in the manner and substantially as described.

29,232.—J. H. H. Bennett, of Hunt's Hollow, N. Y., for an Improved Wagon Brake:

I claim the arrangement of the hinge, e, in combination with the reach, E, and brake head, G, constructed and operating substantially as and for the purpose set forth.

[This invention consists in connecting the brake-head directly to the reach, which is allowed to slide in the axle of the hind wheels, so that, in going down hill, or whenever the motion of the fore wheels is checked, the head, which is sup orted by the axle of the hind wheels, and which is allowed to slide on the forward axle, forces the hind wheels up against the brakes, and as soon as a strain in a forward direction is exerted on the forward axle, the reach, together with the brake-head, is pulled forward and the brakes are taken off; also, in uniting the brake-head and the reach by means of a hinge, so that in backing, the brakes are turned up and the motion of the hind wheels is not interfered with.]

29,233.—John Bean and Benjamin Wright, of Hudson, Mich., for an Improvement in Grain Winnowing Machines:

We claim the combination of a distributor, I, with the sieves, K K K, when said sieves are arranged in relation to said distributor, as set forth, for the purpose of equally distributing the grain, as it is supplied from the hopper.

29,234.—G. E. Baker, of Waukegan, Ill., for an Improvement in Gates:

I claim the combination of the pivoted weighted frame, I, with the platforms, F, and laterally-moving gates, C, as and for the purpose shown and described.

I also claim the combination of the pivoted locking lever, K, bars, L, rods, M, and levers, N, with the platforms, F, and gates, C, as and for the purpose shown and described.

[This invention relates to certain improvements in that class of automatic gates which have platforms applied or connected to them in such a manner as to be depressed by the weight of the vehicle, and operate the gate by their movement. The invention consists in using platforms and weights combined, the same being connected to sliding gates, and arranged in such a way as to operate in a very efficient manner. The invention also consists in a lock attachment applied to the platforms, so as to prevent the movement of the same and the opening of the gate through the agency of the lower animals alone.]

29,235.—G. W. R. Bayley, of Brashear, La., for an Improved Mode of Fastening Nuts on Railroad Bolts:

I claim locking the nuts of railroad rail bolts, by means of a nut guard, G, inserted under them, when the same is held in place under the nuts, by one or more hold-down spikes countersunk into notches or recesses therein, said spike or spikes serving, at the same time, to secure the bracket and rail down to the cross-tie, essentially in the manner described.

29,236.—Etienne Bernot, of Paris, France, for an Improved Machine for Cutting Files:

I claim, first, The peculiar arrangement of the buffer-carrier for the manufacture of file, as described and referred to in Figs. 1 and 2, drawing, I, and Figs. 4, and 5 and 6, drawing II.

Second, The combination of a chain composed of levers and connecting rods, with ordinary or universal joints, capable of working in all directions, as described and referred to in Figs. 1 and 2, drawing, I.

Third, In the arrangement of a guide set parallel to the graver, as described and referred to in Figs. 1 and 2, drawing I, and Fig. 2, drawing, II.

Fourth, In the arrangement of an eccentric, the pressure of which is proportionally exerted upon a spring as before described and referred to in the Figs, 1 and 2, drawing I, and Figs. 1 and 2, drawing, II.

29,237.—Matthew Bartholomew, of Enterprise, Pa., for an Improvement in Machines for Scouring and Separating Grain:

I claim, first, The employment or use of the rotating beaters, H I J, placed within the case, G, formed of perforated segments, i k m, provided with vertical convex ribs, o′, at their inner sides, in connection with the central openings, g p p′, in plates, F K L, to permit of a blast or draught passage at the center of case, G, or around the shaft, E, as and for the purpose set forth.

Second, The combination of the spouts, B′ C, fan, N, beaters, H I J, and case, G, when arranged for joint operation, as described.

[This invention consists in the employment or use of an improved scouring device in connection with blast spout valves and a fan, so arranged as to constitute a simple and efficient implement for the intended purpose.]

29,238.—J. S. Brooks and L. B. Grover, of Rochester, N. Y., for an Improved Gridiron:

We claim an improved cooking utensil, consisting of the sunken grate, c, with the air and flame passages, e e, at the sides thereof, frying surface, G, and reservoir, H, arranged and combined substantially in the manner and for the purposes shown and described.

29,239.—Louis Bonnet, of New York City, for an Improved Meat-cutter:

I claim the arrangement of the shanks of the stationary knives, D, between the flanges of the concaves, so that the inner surfaces of the open part of said shanks shall constitute a part of the hollow cylinder, all as shown and described.

[An engraving of this invention will appear next week.]

29,240.—T. L. Braynard, of New York City, for an Improved Sash-fastener:

I claim the spring catch, d, and latch, a, constructed and arranged as set forth.

29,241.—John Brown, of New York City, for an Improvement in Steam Boilers:

I claim the circulating pipes, g′, and h, formed with the casing, f, of the flue, A, and connected to the casing, d, the said flue and casings being constructed and arranged in the manner specified, to afford access for packing the joints, as set forth.

I also claim arranging the water-flue guard, B, within the furnace, in the manner specified, when fitted with the circulating pipes, i and k, connecting the same to the respective parts of the boiler, for the purposes and as specified.

29,242.—Wm. Cleveland, of New York City, for an Improved Curtain Fixture:

I claim the brackets and sheaves, f f′, and cords, d e, in combination with the spring roller, b, and weighted slat, c, in the manner and for the purposes specified.

29,243.—C. Chitterling, of Dunkirk, N. Y., for a Composition for Lubricating Purposes:

I claim the composition of the within-named ingredients mixed together in about the proportion specified, for the purposes set forth.

[This invention consists in a certain composition which, when it is to be used, is diluted with oil and applied to the axles or to the journals of shafts in the usual manner, and which considerably increases the lubricating quality of the grease.]

29,244.—R. K. Cavanaugh and H. Y. Lazear, of Jersey City, N. J., for an Improvement in Cooking Stoves:

We claim, first, The combination and arrangement with a stove constructed as described, of the fire-box, B, perforated flue box, H b b, and vertical cold air pipe, G, in the manner and for the purpose set forth.

Second, We claim the smoke flue, K, descending flues, c c, flue L, and ascending flue, M, combined and arranged with relation to the several parts of the stove, all as and for the purpose set forth.

[This invention consists in arranging the fire-box and the oven of the stove in such a manner that the boiler holes will each receive a direct and uniform degree of heat from the fire, thus giving all the holes a more equal chance in cooking; and, in conjunction with a fire-box thus arranged, it consists in the introduction of a flue-box along the sides and at the back of the fire-box, for the purpose of drawing-in cold air through the bottom and rearof the stove, and heating the same, from whence the air in this heated state can be conducted to any desirable point about a building for heating the same, as with hot-air furnaces.]

29,245.—John V. B. Carter, of Albany, N. Y., for an Improvement in Stove and Furnace Grates:

I claim the arrangement of grate bars, substantially as described, in order to their being moved past each other with a reciprocating movement, for the purpose of agitating the coal.

Second, The employment of a tridental bar or bars shaped as described, in combination with the fulcrum sockets, g or n, the grate bars and the liberating bar, G.

Third, The construction and arrangement of the door, T, with its opening, k k, to pass the ends of the grates, sliding door, S, to keep grates in place, and niche, L, with its fulcrum socket, n.

29,246.—Thos. Champion, of Washington, D. C., and Charles Champion, of Eldorado county, Cal., for an Improvement in Gas Regulators:

We claim, in combination with a valve and valve stem and an elastic diaphragm, a flanged nut, d, for connecting said stem and diaphragm, the whole being encased without an outer shell, substantially in the manner and for the purpose described.

We also claim, in combination with an enclosed diaphragm, and an enclosed chamber, the air-opening in the cap, I, and the valve, J, for the double purpose of furnishing atmospheric air to the enclosed chamber when the regulator is working and for closing said air-opening should the diaphragm rupture, substantially as described.

29,247.—J. J. Clark, of Philadelphia, Pa., for an Improvement in Telegraphic Repeaters:

I claim the application of springs or mercury cups, or their equivalents, in conjunction with extra local circuit or circuits applied in the manner and for the purpose specified.

29,248.—C. F. Cory, of Lebanon, Ill., for an Improved Furnace Grate:

I claim the construction and arrangement of pendant swinging, movable and detachable grate bars and grates for furnaces substantially as set forth, shown and described.

29,249.—Lucius Crandall, of Plainfield, N. J., for an Improvement in Coal Stoves:

I claim, first, The combination and arrangement of the spherical fire-chamber M, grated at the side N, and capable of revolving on the trunnions, m, with the sliding tube, R, substantially as set forth.

Second, The arrangement of the revolving vessel, M, sliding tube R, case, A, and dust damper, h, substantially in the manner and for the purpose set forth.

Third, In combination with the above, the arrangemont of the flues F E G, and dampers, I and e, substantially as shown.

29,250.—J. G. DeCoursey, of Philadelphia, Pa., for an Improvement in Scissors:

I claim, as a new article of manufacture, the blades, A and A′, B and B′, knife blade, E, and the spring catch, G, or its equivalent, the whole being constructed, combined and operating substantially as and for the purpose set forth.

29,251.—Jacob Dutcher, of Gibson, Pa., for an Improved Self-acting Sleigh Brake:

I claim constructing the roller to which the draught pole is attached so as to act like a crank, as set forth, in combination with the longitudinal rods, m m, cross rod, R, lifting rods, h h, bars, B B, and knives or shoes, k k—the whole arranged and operating substantially as set forth.

29,252.—Daniel De Garmo, of Rochester, N. Y., for an Improvement in Potato-diggers:

I claim, first, Corrugating the shovel, D, of potato-diggers as and for the purpose specified, and giving a corresponding arched shape to the separator, M.

Second, The manner of suspending the shovel, D, and separator, M, by means of the adjustable arms, d, and the draft straps, b, in combination with the cross rod, m, and lever, K, as and for the purposes specified.

Third, Constructing the separator, M, of potato-diggers with the fingers suspended from a single rib or stock, q, at the front end, which leaves the interstices entirely open, thereby providing a free and unobstructed passage for the earth, vines, &c., longitudinally.

Fourth, Giving a side shake or vibration to the rear end of the separator, M, as described, the front end being hung to the shovel, D, by the pivot, p; thus providing a centrifugal force which greatly facilitates the clearing of the shovel, D, and separator, M.

Fifth, The revolving wings, P, in combinaton with the shovel, D, and separator, M, for the purpose specified.

29,253.—John Denley, of Warsaw, Ill., for an Improvement in Coffee Pots:

I claim the combination of the cup, C, siphon, F, and tube, E, with the pot, A, and spout, D, as and for the purpose shown and described.

29,254.—W. W. Dingee, of York, Pa., for an Improvement in Threshing Machines:

I claim forming the cast iron cover with the double concave, as shown, and the peculiarly-formed flange, F, at the feed opening, constructed and arranged as and for the purpose specified.

I also claim the combination of the double boxes, N, cast with the hollow support, O, and filled with the wood, P, arranged substantially and for the purposes set forth.

I also claim, in connection with the above, securing the bevel pinion, I, to the cylinder head, Q, as and for the purpose above described.

29,255.—Wm. Ebbitt, of New York City, for an Improvement in Switch Plates for City Railroads:

I claim, first, The tongue, d, having beveled sides at and near the ends thereof, in combination with the switch plate containing a beveled or undercut groove, as and for the purposes specified.

Second, The steadying portion, 8 8, on the switch plate at the ends of the grooves to take the flanges of the wheels, for the purposes specified; but this I only claim when combined with the beveled tongue, d, as set forth.

Third, Forming the tongue, d, with an inclined or beveled end taking beneath the part, 2, of the switch, to prevent the same raising as set forth.

29,256.—Thomas Earhart, of Donelson, Tenn., for an Improvement in Grain Separators:

I claim, in combination with the roller, I, the slide, G, when arranged with the rod, H, and rotating screw, k, for the purpose specified.

[The object of this invention is to feed the wheat or other grain to the machine in a more regular or uniform manner than usual, and also to present the grain, in its passage through the machine, more favorably to the action of the blast, whereby, in connection with the usual screen or screens, the grain will be thoroughly separated from all impurities.]

29,257.—Ephraim Everson, of Haverhill, Mass., for an Improvement in Pegging Jacks:

I claim the arrangement of the two curved slots, d e, of the plate, D, with the clamp screw and its plates, the same being for the purpose specified.

I also claim the arrangement of the slipping and holding teeth of the cammed and heel stud levers, in connection with the toe rest so applied to the base plate as to be adjustable with reference to the heel rest as specified.

I also claim the arrangement of the two studs, g h, with the two reversed quadrantal slots, the clamp screw and its plates.

29,258.—Elias Forbes, of London, Ohio, for an Improvement in Capstans for Ditching Plows:

I claim, first, The levers, C C, and cord, d, or their equivalents, when both shall be operated in the manner and for the purpose substantially set forth and described.

Second, The capstan, B, hinges, a a, tongue, G, slide, e, brace or lever, x, in combination with levers, C C, cord, d—the whole being arranged in the manner and for the purpose substantially set forth and described.

29,259.—D. J. Ferry, of Philadelphia, Pa., for an Improvement in Machines for Making Friction Wires:

I claim, first, The tools, D and E, when arranged in respect to each other and the die, F, substantially as described and for the purpose of pressing out, punching and cutting off in proper lengths, at one operation, the friction wires for frictional priming.

Second, The projection, r, with its angular opening when arranged in respect to the tool, D, substantially as described and for the purpose specified.

Third, The guide, H, with its opening, C, when arranged in respect to the tools, D and E, substantially as described and for the purpose specified.

Fourth, The stop, I, and its recess, t, when arranged in respect to the tool, E, substantially as described and for the purpose specified.

Fifth, The projection, y, with its angular opening, when arranged in respect to the tool, E, substantially as described and for the purpose specified.

29,260.—Wm. Fulton, of Cranberry, N. J., for an Improvement in Lamps.

I claim the peculiar construction of button, G, as shown in Fig. 5 and Fig. 6, or its equivalent, in combination with the gauze wire plates, C and D, as shown in Fig. 2, or the perforated plates, C and D, as shown in Fig. 3—the whole being arranged substantially as and for the purpose set forth.

29,261.—Henry Fellows, of Bloomfield, Ind., for an Improvement in Water Wheels:

I claim the attaching of the curved flanches, D, to the bottom of the penstock, A, so as to project within the wheel and form scrolls and water passages, e e, at the inner sides of the buckets or between the same and the shaft, C, and chutes, E; all being constructed, arranged and operated in the manner and for the purpose set forth.

[This invention relates to an improvement in that class of water wheels in which the water is made to act upon the buckets both by impact and re-action. The object of the invention is to obtain a better combination than hitherto of the two forces or powers aforesaid, and consequently a more efficient wheel.]

29,262.—T. J. Fitzpatrick, of New Orleans, La., for an Improved Chimney Cap:

I claim the combination of cap, a, pipe, b, and bar, c, made and operated as and for the purpose set forth.

29,263.—James Flattery, of Brooklyn, N. Y., for an Improvement in Faucets:

I claim suspending the valve vertically beneath the valve seat solely by the flexible disk or diaphragm, D, substantially as described, when said valve is completely detached from and acting independently of the spigot handle, G, in the manner and for the purposes specified.

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29,264.—Wm. Flowers and Z. S. Patton, of Bangor, Maine, for an Improved Boat-lowering Apparatus:

We claim, first, The disks, l, and pawls, p, for locking the davits, E E′, operating substantially in the manner described.

Second, Lifting the pawls by the movement of the cradle, H, substan tially as set forth;

T hird, The above-described boat-lowering apparatus consisting of the davits, E E′, with their locking apparatus, the winch, D, with its pawl, v′, and brake lever, v, and the pawls, f, arranged and operating in the manner substantially as specified.

Fourth, The blocks, F, with their hooks, m, substantially as described.

29,265.—George Gage, of Kendall's Mills, Maine, for an Improved Secretary Bedstead:

I claim the arrangement of the chambers, D E, with the case, A, the bed frame and the stationary part, B, arranged and operating as described.

29,266.—Birdsill Holly, of Lockport, Ill., for an Improvement in Pumps:

I claim the combination of the curve-flanged spout section, B, with the side plates, A A, and cross bolts, b b, so as to furnish a suitable and convenient support for the pump cylinder and its dependent parts, and a ready means of reversing the position of the spout; the whole constructed, arranged and operating substantially as specified.

I also claim the arrangement and combination of the adjustable fulcrum yoke, G, and arcs, L L, having adjusting holes therein with the lever, H, having a curved short arm with adjusting holes therein—all substantially as and for the purpose specified.

I also claim the connecting link, m, between the piston and valve, k, in combination with the notch, o, and the stop, w, operating substantially as and for the purposes set forth.

29,267.—Henry Humphreyville, Jr., of Strasburg, Pa., for an Improvement in Hot Water Apparatuses:

I claim the vessel, L, provided with a removable perforated partition, M, and valve, V, combined with and secured to the furnace by means of the tubular screw, K, and adjustable burrs, B B′, on said furnace, substantially as and for the purposes specified.

29,268.—W. C. Hicks, of Boston, Mass., for an Improvement in Sewing Machines:

I claim the application to a single-thread sewing machine of an automatic feeding apparatus or device operating in concert with an eye-pointed needle and looper or their equivalents, so as to make a succession of chain stitches of different lengths, so that the long stitches in a seam are connected by one or more short stitches alternately, substantially as and for the purpose or purposes set forth.

29,269.—Josiah Hodgson, of New Michigan, Ill., for an Improved Mole Ditching Machine:

I claim the combination of the scraper, J, and shaft, e, with the revolving mole, G, and colter, C, as and for the purpose shown and described.

[This invention consists in pivoting a shoe of a peculiar form to the lower end of a fixed colter or standard, and in the employment of a guide screw suitably arranged in connection with the shoe and standard by which the heel of the shoe may be raised or depressed for the purpose of giving an upward or downward direction to the tooth as it is moved through the ground. It also consists in attaching by a loose chain connection, to the heel of the plow or standard, a conical, revolving and spiral-ribbed mole, in the rear of which is a vertical scraper for loosening the clay in the bottom of the channel formed by the preceding parts, with which the channel formed by the shoe is enlarged and the earth packed closely, and the opening formed by the colter effectually closed.

29,270.—S. S. Hartshorn, of New Haven, Conn., for an Improvement in Buckles:

I claim, as a new article of manufacture, the combination of the tongue part with the bow part, when the whole is constructed for use substantially as described.

29,271.—J. F. Hamilton, of Pittsburgh, Pa., for an Improvement in Pumps for Steam Engines:

I claim the use of the stopper or regulating valve, i, when placed in the receiving port, h, and used as described and for the purpose set forth.

29,272.—B. B. Hotchkiss, of Sharon, Conn., for an Improvement in Projectiles for Rifled Ordnance:

I claim, first, The tapering body, B, and the corresponding form of the belt, D, in combination with the the cap piece, F f, or its equivalent, for the purpose of expanding D equally and to a definitely controlled extent at each end. substantially as set forth.

Second, Causing the edge of the cap, F, to embrace a portion of the belt. D, so as to lock and confine D at that edge, substantially as and for the purposes shown and described.

Third, The combination of the lip, C, at the forward edge, with the means herein described of confining the rear edge of the belt, D, for the purpose of retaining the parts of the latter between them when burst open or otherwise fractured, as set forth.

29,273.—Julius Hornig, of Newark, N. J., for an Improvement in Sash Fastenings:

I claim the combination of the eccentric, C, and plate, D, applied to the sash, B, and arranged relatively with the stile, d, of the frame, A, to operate as and for the purpose set forth.

[The object of this invention is to obtain a fastening for window sashes which may, by a very simple adjustment, be used to retain the sashes at any desired hight within the range of their movement, and also used as a lock to secure the sashes in a closed state so that they cannot be opened or moved at the outer side of the window. The invention consists in the employment of an eccentric fitted within a suitable plate so arranged and applied to the sash as to effect the desired results.]

29,274.—M. W. Helton, of Bloomington, Ind., for an Improved Machine for Registering Fares:

I claim, first, The arrangement of a slide, E, or its equivalent, in combination with a rotary shaft, F, and stops, d, or their equivalents constructed and operating substantially as and for the purpose described.

Second, Combining with the slide, E, two series of stops, d and i, and a series of registering wheels, K L M N, or their equivalents, substantially as and for the purpose specified.

[This invention consists in arranging a slide connected with a rotary shaft in such relation to a series of movable stops that, by means of said stops the amount of motion given to the slide is regulated, thereby rotating the shaft for one or more or only for a part of a revolution. It also consists in combining with said slide two series of stops, each to be operated independently of the other, one to indicate the number of cents from 10 to 100, and the other the number of dollars, in combination with a registering apparatus, in such a manner that, by adjusting said stops, the motion given to the rotary thaft by means of the slide can be regulated to correspond to any given sum of money and to register the same.]

29 275.—G. Z. Hockenburry, of Pittsburgh, Pa., for an Improvement in Machines for Dressing Millstones:

I claim the main or power sha , c, having the screw, f, the intermediate shaft q, and tubular crank-shaft, r, with the tool-holder, k, and table, h, as they are arranged and operated for giving the tool the vertical and feeding motions as set forth.

29,276.—C. E. L. Holmes, of Waterbury, Conn., for an Improvement in Forming Seamless Tubes:

I claim the process described for making seamless tubes, which consists in casting the metal with a thin metallic strip in its center, and then rolling the same in the manner and for the purpose shown and described.

[This invention consists in casting the metal of which the tubes are to be made in blocks or ingots of a definite length and thickness, and of a width commensurate with the number and size or sizes of tubes to be made therefrom, and in casting these ingots in such a manner that after they are reduced to the desirable thickness by passing them between rollers whose surfaces are plane and parallel with each other, the portions from which the tubes are to be formed may be opened by any suitable means and rendered cylindrical, separated from each other aud finished up separately in a perfect manner, with great facility and with the metal in a cold state.]

29,277.—J. W. Hopper, of New York City, assignor to himself and E. G. Allen, of Boston, Mass., for an Improved Low-water Detector for Steam Boilers:

I claim forming in the pipe, h, that communicates with the boiler, an air-chamber or space between the water in the said tube and the fusible plug as set forth and for the purposes specified.

29,278.—Enoch Hidden, of New York City, for an Improved Portable Water Closet:

I claim the combined arrangement of the hinged lid, D, with the flanch, s, the rubber packing, a, and bucket, L, with the removable seat piece, S—the whole constructed and operating as specified for the purposes set forth.

29,279.—John Henry, of Lynchburgh, Va., for an Improvement in Pressing Tobacco:

I claim the construction and arrangement of a series of frames and molds so fitted and placed together that a large quantity of tobacco may be flattened or milled between thin boards or plates into bars or plugs, by one set of plungers, as described for the purposes specified.

29,280.—Thomas Harvey and Nicholas J. Becker, of Amsterdam, N. Y., for an Improved Horse-power Brake:

We claim the self-operating brake of endless-chain horse-powers, which consists of the knuckle, F, and the trip lever and pulley, G, worked by the driving belt.

29,281.—C. W. Isbell, of New Haven, Conn., for an Improved Gas and Water Pipe Joint:

I claim the combination of the wedge-shaped cavity, the shoulder, F, and the upper and lower openings of the socket, A, with the wedge-formed portion of the pipe, B, the semi-circular or other projection, D, the recess formed between the end of the pipe, B, and the shoulder, E—the whole arranged substantially as specified for the purpose set forth.

29,282.—E. Jacobs, of Cincinnati, Ohio, for an Improvement in Iron Prisons:

I claim constructing and arranging plate iron cells in jails separately from each other, with vertical spaces, e, between the cells upon the same level, and horizontal spaces, f, between cells arranged one above the other, substantially and for the purpose described.

29,283.—B. H. Jenks, of Philadelphia, Pa., for an Improved Pattern Chain for Looms:

I claim the use of a pattern chain, B B, constructed with teeth upon its outer surface and operated directly by the pawl, D—the whole being arranged and operating substantially as set forth.

29,284.—W. F. Johnson and W. R. Johnson, of Wetumpka, Ala., for an Improvement in Bridle Bits:

We claim a bridle bit composed of two bars, A A, crossed and connected by a joint or fulcrum, a, provided with buttons, c c, and a spring, f, to operate as and for the purpose set forth.

28,285.—A. M. Karr, of Mount Pleasant, Iowa, for an Improvement in Mole Plows:

I claim, first, The combination, with the mole, B, of the inclined side fins, c c, bottom groove, e, and margins, e′, top groove, d′, and margins, d, and rolling heel, E, arranged in relation to each other as shown and described.

Second, I claim the combination of the closing scoop, C, with the coulter, B′, and scoop mole, D, constructed and arranged, in relation to each other, as and for the purpose set forth.

29,286.—S. B. Lawrence, of Hookstown, Pa., for an Improvement in Machines for Shocking Corn Stalks:

I claim the combination and substantial arrangement of the movable frame, D, roller, E, brace arm, H, bar, J, with the bench, A, having one jointed leg, C, as set forth, for the purpose specified.

[This invention consists in the use of a peculiar-shaped three-legged bench, one of the three legs of which is hinged to the bench top, a windlass, hinged brace board, and a movable bar that is placed transversely through the bench top, with a suitable cord or rope.]

29,287.—J. P. Lindsay, of New York City, for an Improved Cartridge Case:

I claim, as a new article of manufacture, the cartridge case made with its chambers for receiving several charges, in combination with the discharging tubes or passages, when the whole is combined, arranged and fitted for use, substantially as described.

29,288.—Edward Landis, of Baltimore, Md., for an Improved Rocking Propeller:

I claim the arrangement of the rockers, E, with the wheels, B′, the connecting rod, c, the crank, F, and platform, A, so that the motion produced by the rocking is converted into a rotary motion to propel the whole machine, substantially as and for the purpose specified.

29,289.—John McDermott, of Washington, D. C., for an Improvement in Couplings of Thills for Axles:

I claim the end washers, e e, upon the shoulders or sleeves, d d, of the shaft-iron head, as set forth.

I also claim the curved segmental shoulders or guards, m m, on the lugs of the clip, in combination with said end washers and sleeves, d d, as set forth.

29,290.—Henry Mason, of Lancaster, Mass., for an Improvement in Cotton Presses:

I claim combining the platen shaft, or any equivalent shaft, with the driving shaft, or any equivalent shaft, by means of increasing and decreasing gears, substantially as and for the purpose specified.

29,281.—James Monteith, of New York City, for an Improvement in Globes:

I claim the employment, in combination with a terrestial globe, of one or more figures attached to the center thereof by one or more elastic cords or springs of proper length to pass through the shell of the globe and hold the figure or figures against the external surface thereof, substantially as and for the purpose specified.

29,292.—James Monteith, of New York City, for an Improved Method of Suspending School Globes:

I claim the combination, with the globe constructed in hemispheres and hinged together, as described, of two rings or staples, a a, and a suspending cord, b, applied as specified, for the purpose set forth.

29,293.—J. B. Morris, of Ansonia, Conn., for an Improvement in Machines for Polishing Cabinet-work:

I claim the combination of the traveling carriage, B, movable roller frames, G G, and levers, I I, when the same are arranged in the manner and for the purposes set forth.

[This invention consists in combining with a suitable carriage that is capable of receiving a rectilinear reciprocating motion, a movable frame carrying a roller, over which passes an endless band, and a yielding pressure roller that is hung in the movable frame and constructed in such a way that it will act upon the endless band that has an emery (or any other suitable powder) surface, and keep the band in contact with the stuff that is passed under it, however ununiform may be the varnished surface.]

29,294.—Robert Morrison, of Rahway, N. J.. for an Improved Coupling of Thills to Axles:

I claim the combination of the swivel loop, b, the spring latch, c, and the clip, a, in the manner set forth.

29,295.—Cyrus Marsh, 2d, of Natchez, Miss., for an Improved Cracker Machine:

I claim the described arrangement of the rollers, C, stamping cylinder, D, pressure cylinder, E N O, scraper, P, and carrier, Q; the said parts being constructed, combined and operating in the manner and for the purposes set forth.

29,296.—G. W. Martin, of West Morrisania, N. Y., for an Improved Submarine Operator:

I claim the arrangement of an apparatus for operating underwater by means of a tube or well passing through the center of a vessel, or near it, to the bottom, for the purpose of searching or working on the ground beneath, substantially in the manner and for the purposes set forth.

29,297.—Richard Mohler, of Lancaster, Pa., for an Improvement in Smut Machines:

I claim placing in the arches of smut machines or other grain-separators, a chamber, constructed as described, and when operating substantially as specified.

29,298.—G. R. Moore, of Pittsburgh, Pa., for an Improvement in Fire Pokers:

I claim the use of the bars, a a, or their equivalents, to prevent the poker from clamping.

29,299.—H. W. Norville, of Livingston, Ala., for an Improvement in Wagon Brakes:

I claim the combination of the draught pole, D, and lever, E; the latter being connected with the brake bar, G, and all arranged to operate as and for the purpose set forth.

[This invention relates to an improvement in that class of brakes which are termed "self-acting;" being connected with the draft pole in such a way as to be acted upon by the momentum or gravity of the vehicle or the backing of the team. The object of the invention is to obtain a simple brake of the above class, and, at the same time, one that will be under the complete control of the driver, so that it may be rendered operative or inoperative, when desired, and also rendered capable of being actuated manually by the driver, when necessary, and at such times when it cannot operate automatically.]

29,300.—D. H. Nation, of Albany, N. Y., for an Improvement in Stove Grates:

I claim, first, The loops or elongated bearings, E E, in combination with the reciprocating shaft or spindle, D, substantially as and for the purpose specified.

Second, I claim the sliding plate, F, when used in combination with the elongated bearings, E, and the shaft or spindle, D, substantially as and for the purpose specified.

29,301.—D. S. Neal, of Lynn, Mass., for an Improved Fire-escape Attachment of Horse-stalls:

I claim the use of the main pipe, C, and the pipes, D D D D, constructed as described, and operating, in connection with the lever, F, in the manner and for the purpose set forth.

I also claim the whips, I I I I, in connection with and operated by the rod, H, and the crank, K, in the manner and for the purpose set forth.

29,302.—George Neilson, of Boston, Mass., for an Improvement in Coffee Pots:

I claim the combination and arrangement of the receiving tunnel, F, its valve, G, and weighted lever, H, or its equivalent, with the cafetiere or the cover of its coffee-holder; the same being for the purpose and to operate as described.

I also claim the combination and arrangement of the safety valve, b, and opening, w, with the tunnel, its valve and weighted lever, applied to the cafetiere as stated.

29,303.—Jacob Pringle, of Summer Hill, Pa., for an Improved Mode of Obtaining Motive Power:

I claim the bucket wheel, C, cistern, A, fire-place, D, blowing apparatus, G, and air pipe, E; the whole being constructed, arranged and operating as and for the purpose set forth.

29,304.—Wm. S. Pratt, of Williamsburgh, N. Y., for an Improved Compensating Lever Spring:

I claim the arrangement and combination of the levers, A A′ and B, substantially as and for the purposes set forth.

29,305.—J. M. Perkins, of Chicago, Ill., for an Improvement in Water Wheels:

I claim attaching the buckets, g, to the side piece of the wheel by the pins, x, and arranging them upon the wheel, as set forth, in combination with the breast and under-shot chutes, as described.

29,306.—George Palmer, of Littlestown, Pa., for an Improvement in Adjustable Carriage Springs:

I claim placing india-rubber, or an equivalent yielding substance, between elliptic springs for vehicles, and a similar substance on the top of the bolster or rocker or underneath the axle-tree, in combination with a regulating screw and hand or thumb nut; all arranged substantially as and for the purposes specified.

29,307.—Wm. P. Parrott, of Boston, Mass., for an proved Steam Pressure Gage:

I claim the combination of the insulation case or chamber, B, with the compound bar, R, and the space chamber or device for generating or holding the steam; the whole being arranged substantially in the manner and to operate as described.

29,308.—C. T. Pangborn, of Brooklyn, N. Y., for an Alarm Water Gage for Steam Boilers:

I claim the arrangement of the flange, E, at the bottom of the float, which slides up and down on the stationary valve rod, C, and which operates in combination with the valve, B, spring, D, and disk, c, substantially as and for the purpose set forth.

[This invention consists in the arrangement of a flange at the lower portion of the float, allowing the water to sink down below the bottom of the same without giving the steam a chance to act on the under surface of the same, so that the weight of the column of water supported by said flange assists in opening the valve which leads to the steam whistle; also, in making the float to slide on the stationary rod that bears the valve and which is kept up by a suitable spring in such a manner that the valve is closed permanently and tightly until the sinking water allows the float to strike a collar at the lower end of said rod and to open the valve.

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29,309.—Barton Pickering, of Dayton, Ohio, for an Improvement in Cocks:

I claim the combination of the hollow stem, H, float valve, P, and box, L, with concentric partition, N, when the whole are constructed to operate substantially as described, for the purposes set forth.

I claim, in combination with a hollow valve stem, a whistle, so arranged as to be operated or sounded by the air issuing from the barrel through the cock, substantially as described.

In combination with a hollow valve stem, I claim the adjustable pipe, Q, provided with a packing, so that it may be adjusted higher or lower in the valve stem, as specified.

29,310.—E. P. Russell, of Manlius, N. Y., for an Improved Pawl and Ratchet:

I claim the pawl, B, and lever, D, combined; being composed of one piece of metal, operating substantially as described and for the purposes set forth, of giving feed or other motion,

29,311.—Samuel Ring, of Cleveland, Ohio, for an Improvement in Straw-cutters:

I claim the sash, C, crank, F, connecting rod, G, pin, H, guides, E, and arm, I, as described; the several parts being constructed and arranged, in relation to each other and to the feed rollers, and operating in the manner and for the purpose set forth.

29,312.—S. H. Ransom, of Albany, N. Y., for an Improvement in Stoves:

I claim combining with the fire-chamber and the usual oven at the back thereof, an inclosed roasting-chamber in front of the fire-chamber, and over what is the usual fire-hearth, by extending the top and sides as far forward as the usual hearth-plate and inclosing the front; all substantially as and for the purposes specified.

And I also claim, in combination with the inclosed roasting-chamber and with the main oven, back of the fire-chamber, and with the flues to heat the same, the forming of flue spaces over the top and under the bottom, connected by diving flues at the sides, substantially as and for the purposes specified.

I also claim the arrangement of the air-chamber, to which air is supplied from the room which is interposed between the fire-chamber and the inclosed roasting-chamber over the fire-hearth, in combination with a horizontal perforated partition in the said air-chamber and above the apertures for the admission of air, that the air to be heated may be distributed along the whole length of the said air-chamber, so that when heated it shall escape from the upper part thereof in a sheet into the roasting-chamber, and thence pass down, and thence to the ash-pit to supply combustion, as described.

And I also claim, in combination with the inclosed roasting-chamber and double plates interposed between them, the making of one of the said plates with apertures governed by a damper or register, to regulate the heat for roasting, substantially as specified.

29,313.—J. M. Roberds, of Plaisance, La., for an Improved Mode of Detaching Horses from Vehicles:

I claim, first, The combination and relative arrangement of swingle-tree, g, vertical cockeyes, c, cockeye pin, a, lifting bar, r, cord, f, and tube, h, substantially as and for the purpose set forth.

Second, The combination of a perforated tongue, n, and perforated crab-iron, o, crane, j, bolt, i, cord, h′, and tube, t, with the swingle-tree, g, vertical cockeyes, c, cockeye pin, b, lifting caps or bars, r, cord, f, and tube, h, substantially as and for the purposes set forth.

29,314.—H. E. Rogers, of South Manchester, Conn., for an Improved Candlestick:

I claim the construction and application of an elastic or spring thimble, d, secured within the upper end of a candlestick, a, or cap, c, substantially in the manner as and for the purpose described.

29,315.—J. T. Smith, of Portsmouth, Va., for an Improvement in Machines for Threshing Peas and Beans:

I claim the rotating beaters, f, and stationary slotted plate, G, combined with the fan, I, and arranged in a suitable frame, A, in relation with the hopper, H, and box, C, to operate conjointly as and for the purpose set forth.

[This invention has for its object the rapid threshing of peas and beans and the separation of the pods and offal therefrom at one operation, and with one and the same machine. The improvement consists in the use of rotating beaters, in connection with a stationary slotted plate and a fan, arranged for joint operation so as to effect the desired end.]

29,316.—Gerard Sickles, of Roxbury, Mass., for an Improvement in Water Meters:

I claim the employment of the four puppet valves, C C D D, arranged upon one shaft within a pipe or chamber having four partitions, e e′ f f′, against the sides of which said valves are alternately seated, in combination with the piston, K; all substantially as shown and described, for the purpose set forth.

29,317.—James Sadler, of Egremont, Mass., for an Improved Coupling for Thills to Axles:

I claim the application of the bolt connecting the shafts or pole of a carriage with the band or clip attached to the axle of a pair of hooked clasps, contrived to shut over and encircle such bolt, which bolt may be permanent (allowing sufficient play, merely, for the raising and lowering of the shaft or pole wherewith said clasps are permanently connected) and kept in place by a band and spring, by means of which the whole may be securely held, or, if desired, may be readily detached.

29,318.—Alexander Schwaninger, of Milwaukie, Wis., for an Improvement in Apparatuses for Generating Gas:

I claim the retort box, constructed with the ribs and arranged within the retort, as described, in combination with the arrangement of the pipes, whereby the retort and pipes are entirely surrounded by heat, the tar allowed to flow down, and the retort box or any one of the pipes can be removed without disturbing the other parts, as set forth.

29,319.—I. R. Shank, of Buffalo, Va., for an Improved Flour Chest:

I claim the arrangement, as shown and described, of the biscuit-board, H, movable board, H′, angular supports, D, ventilators, G, partitions, C, box, A, and hinged top, B.

29,320.—Sylvester Stevens, of Sacramento, Cal., for an Improved Hay Press:

I claim the entire machine, together with the combination and application of the lever and pulleys, as set forth in this specification and the annexed drawings, for the purpose of pressing hay, cotton and hemp, to be known as "Stevens' Compound Pulley and Lever Press."

29,321.—Sumner Sargent, of Watertown, Mass., for an Improvement in Lamps:

I claim the combination of the perforated lamp top, A, partition plates, b, and deflecting cone, B, substantially as and for the purpose set forth.

[The object of this invention is to obviate the difficulty attending the fluctuation of the air and the lamp, produced by the opening and closing of doors, the turning of the leaves of books, papers, &c. The invention is more especially designed for lamps which burn coal oil and other volatile hydro-carbons which require a considerable amount of oxygen to support a proper combustion, the flames of which are materially affected by an unequal supply of the same. The invention consists in dividing the air-chamber or perforated lamp top, below the deflecting cone, into compartments, whereby the desired end is attained.]

29,322.—I. C. Saunders, of Trenton, Mich., for an Improved Method of Applying Fusible Metallic Plugs to Steam Roilers.

I claim, first, The conical plug seat, j, when formed on an elevated semi-spherical base, l, in combination with the hollow screw rod, n, in the manner and for the purpose described.

Second, The combination of the cap, m, with the hollow screw rod, n, plug seat, j, and semi-spherical base, l, in the manner and for the purpose described.

Third, The peculiar mechanism described of arranging and combining the tube, t, with the plug seat, j, of semi-spherical base, l, and screw rod, n m, for the purpose set forth.

Fourth, The use of the head, v, and the cap, r, for holding a seal to detect any carelessness on the part of the engineer, as set forth.

29,323.—John Schatt, of Philadelphia, Pa., for an Improvement in Gas Meters:

I claim making the frame, A, with a projecting extension, 1 1, around the outer edge, substantially in the manner and for the purpose set forth and described.

29,324.—John Schley, of Savannah, Ga., for an Improvement in Lamps:

I claim the combination and arrangement of the tubes, B C D, with the two wicks, E K′, button, J, and body, A, with or without the shade and chimney, L, as and for the purpose set forth.

[This invention relates to a lamp for burning coal oil, and consists in a combination of parts arranged in such a way as to supply the requisite quantity of oil and oxygen, so as to obtain a brilliant illuminating flame.]

29,325.—J. W. Shipman, of Springfield Center, N. Y., for an Improvement in Mowing Machines:

I claim, in combination with the ratchet, I, pawl, K, and drum, J, the intermediate plate, d, and spring, a, arranged and operated in the manner described, for the purpose specified.

[This invention consists, firstly, in an improved construction of the main frame of the machine, whereby the same may be entirely of cast metal, yet light and of simple arrangement; secondly, in the improved arrangement of means for readily connecting and disconnecting the driving wheel from the other driving mechanism; thirdly, in an improved means for raising the sickle and retaining it in an elevated state, when desired; fourthly, in an improved mode of attaching the draft pole to the machine; all being so constructed and arranged as to form a simple and durable machine.]

29,326.—D. E. Somes, of Biddeford, Maine, for an Improved Heel for Boots and Shoes:

I claim the combination of the stiffener, C, and the flange, D, with the metallic heel, A, the same being connected and used substantially as and for the purpose specified.

27,327.—J. C. Stoddard, of Worcester, Mass., for an Improvement in Teeth for Scattering Hay:

I claim the employment of teeth, B, that are made with a straight tip and a boss or swell in front, which is presented to the grass, as shown and described, thereby preventing the gathering of the grass and causing it to be thoroughly scattered, all as set forth.

I also claim the employment, in combination with said teeth and the bar, c, of the grooved angular fastening plates, A, provided with eyes, a, as and for the purpose set forth.

[This invention is a novel form of tooth, to be used in rotary hay-making machines, for raking and making hay, and for preventing the hay from entangling in the rakes or winding on the shaft of the reel.]

29,328.—C. N. Tyler, of Washington, D. C., for an Improvement in Gas Generators:

I claim, first, The generation of illuminating gas by the heat of the burner which consumes the same, when constructed as described, the flame serving the purpose of illumination and at the same time heating the retort or retorts, substantially as set forth, for the purposes specified.

Second, I claim enclosing the retort or retorts within a heater through which the draft passes, for the purpose of concentrating the heat, and thus producing a gas-generating temperature from the illuminating flame, substantially as set forth.

Third, I claim placing the end of the gas-escape tube, C, at the hottest point of the retort or in the focus of heat, for the purpose of superheating a small jet of gas as it escapes to the burner, substantially in the manner and for the purpose set forth.

Fourth, I claim regulating the heat by the relative adjustment of the flame and heater, for the purpose of controlling the amount of illuminating flame, substantially as described.

Fifth, I claim the combination of stopcock, G, with the tubes, A and C, for the purpose of admitting the flow of fluid directly to the burner, or conducting the same to the heater, K, and bringing the gas to the burner, substantially as set forth.

Sixth, I claim the revolving burner, D, in combination with the heater, K, and the retort or retorts, substantially as set forth, for the purpose specified.

Seventh, I claim the peculiar mode of packing the stopcock, B, by means of the level or levels compressing the cord (or other fibrous packing) upon the stem of the cock, substantially as set forth, for the purposes described.

29,329.—L. D. Towsley, of New York City, and E. Matteson, of Brooklyn, N. Y., for an Improved Motive Power:

We claim, first, The weighted lever, F, placed in position as shown, in combination with its connections at top and bottom, arranged and operated for the purpose set forth.

Second, The combination of the oscillating frame, K, general frame, A A A, side levers, M M, and pendulum weights, N N, when the same shall be arranged and operated as set forth and for the purpose specified.

29,330.—B. W. Taber, of Quaker Street, N. Y., for an Improvement in Chimneys:

I claim the arrangement and combination with the top, A, of the internal horizontal partion, c, vertical pipe, d, flange, e, and air-space, f, as and for the purpose shown and described.

[The object of this invention is to supersede the chimneys of masonry ordinarily used, obtain one that may be constructed at a less cost and without the possibility of allowing leakage around it at the roof.]

29,331.—C. B. Thayer, of Boston, Mass., assignor to Charles Robinson, of Cambridgeport, Mass., for an Improved Chain Shot Battery:

I claim adjusting the two barrels in respect to each other upon a common axis, nearly or exactly in which is located a common vent for firing the two charges exactly at the same moment, substantially as and for the purposes specified.

29,332.—John Tiebout, of Brooklyn, N. Y., for an Improvement in Buckles:

I claim the arrangement of the adjustable ratchet plate, A, in combination with the tooth-edged loop, C, constructed and operating in the manner and for the purpose specified.

[This invention consists in the arrangement of a serrated plate or ratchet made adjustable on a strap by means of a stationary tongue, in combination with a tooth-edged loop, in such a manner that the strap can be adjusted to any desired length and its two ends fastened together simply by sliding the loop over the ratchet, which latter prevents the same sliding back and retains it the more tenaciously the stronger the strain on the strap.]

29,333.—J. W. Truax, of Richford, Vt., for an Improvement in Water Wheels:

I claim, first, The auxiliary bucket, L, on the inclined rim, f, in connection with the conical rim, A, attached to the flanch, C, the parts being arranged relatively with each other, to operate as and for the purpose set forth.

Second, The employment or use, in connection with a draught tube, B, of a valve, F, placed in such relation with the penstock, to operate as and for the purpose set forth.

Third, The arrangement of the penstock, D, flanch, C, draught tube, B, and cross-bars or bridge-trees, J, as shown and described, to render the wheel and parts pertaining thereto very accessible for repairs.

[This invention relates to certain improvements in that class of water wheels which are placed on a vertical shaft, are actuated by the re-active force of the water, and have a draught tube attached. The object of the invention is to economize in the use of the water by appropriating or applying the leakage water to the wheel, so as to make it subservient in driving the same, and obviating the friction hitherto produced by water-tight packing or joints.]

29,334.—Jonathan Vaile, of Miami, Ohio, for an Improvement in Steam Boilers:

I claim the combination and arrangement of the flat vessels, C C C, the steam chamber, D, the smoke stack, B, and the furnace and fire spaces, K K′; the whole being constructed and used substantially as and for the purpose specified.

29,335.—A. J. Vandergrift, of Saint Louis, Mo., for an Improvement in Grain Separators:

I claim, first, The plates, f, and bearings, f″, forming the perforated and corrugated spiral ledge, with bolts or rods, f′, passing through and securing them to the rim or flanch, d, of concave, J, with perforated and corrugated lining, e, combined to form the revolving cylinder, e″, communicating with opening, o, arranged relatively with cylinder, K′, and operated in the manner and for the purpose set forth.

Second, The hollow cast iron longitudinal sections, g, filled with stone, m, in connection with the longitudinal perforated sections, h, and loose or movable curbs or sections, g*, combined and arranged relatively with semi-circular flanches, f* f*, all forming a cylinder, K, and arranged relatively with cylinder, e, and communicating with chute, n, and trunks, k k, to operate as and in the manner set forth.

Third, The hopper and deflector, H, and the deflector, a**, dividing the current in the flues, G and M, and throwing half on each side, through openings in the side passages, p p, all being constructed and arranged, substantially as and for the purpose specified.

Fourth, The cross-bar, e**, by which the lower end and slip joint of tube, I, may be adjusted laterally as well as up and down, as desired, when arranged as set forth.

Fifth, The flues, P, chamber, L, flues, M and G, in connection with side passages, p p, deflectors, H a**, and trunks, k k, arranged relatively with each other, the fan and fan-box, N, the scouring apparatus and shafts, B E, to operate as and for the purpose set forth.

29,336.—S. W. Wood, of Watertown, N. Y., for an Improved Edge Tool-sharpener:

I claim, as a new article of manufacture, the edge tool-sharpener produced in the manner substantially as described, the same being made of steel, cast iron or other suitable metal, in one piece of a prismatical or other form, having three or more faces, such faces presenting different degrees of superficial roughness in the grain or texture of the metal, whereby one and the same instrument may be adapted to the various uses or purposes, as set forth.

29,337.—G. B. Arnold, A. H. Price and A. S. Urner (assignors to themselves and A. and J. S. Arnold), of New York City, for an Improved Fluting Apparatus:

We claim, first, The fluting device described, consisting of the fluting rods, B C C, heating flame, m, spring, h, and treadle, D d, or their equivalents, arranged and operated substantially as set forth.

Second, Adjusting the heat-receiving points, e e e, relatively to the working surfaces of the iron, substantially in the manner and for the purpose set forth.

29,338.—James Bingham (assignor to F. D. Bingham), of Philadelphia, Pa., for an Improved Surge-reliever for Cables:

I claim, as an improved article of manufacture, a surge-reliever, consisting of a chain, having each of its links composed of two stirrup bolts or links, a a′, the limbs of which are interposed; their ends passing through heads or plates, b b, and secured from withdrawal by nuts, c c, the heads being separated by a block of rubber, A, through which the links also pass, all as shown and described.

[This is is a useful invention, to be applied to the cables of vessels. Its character may be understood from the claim.]

29,339.—G. C. Bartlett, of Paris, N. Y., assignor to D. M. Osborn & Co., of Auburn, N. Y., for an Improvement in Potato-diggers:

I claim, first, The combination of the shovel or digger and shaker, one arranged immediately in rear of the other, so that the shaker shall receive from the shovel all that the shovel digs up, and sift or riddle it, throwing the potatoes on top, substantially as described.

I also claim suspending and vibrating the shaker from and around a point, pivot or pin, b, that is high enough above the ground not to be interfered with by the dirt, vines, weeds, &c., substantially as described.

29,340.—R. F. Cook, of Potsdam, N. Y., assignor to himself and M. J. Whitmore, of same place, and F. G. Johnson, of Brooklyn, N. Y., for an Improvement in Breech-loading Fire-arms:

I claim the combination of the prolonged nut, G, with the screw, H, or their equivalents, acting upon each other, substantially in the manner and for the purposes as set forth.

29,341.—H. F. Hicks (assignor to Hicks Brothers), of Grand View, Ind., for an Improved Cotton and Hay Press:

I claim, first, In combination with the nut screw and piston of a cotton or hay press, the described, or a substantially equivalent arrangement of inclined planes, M M′, operating to elevate and depress the follower, N, during the retrograde rotation of the screw, substantially as and for the purpose set forth.

Second, The combination of the follower, N, and rod, O O′, constructed and operating in connection with the inclined planes, M M′, substantially as set forth.

Third, The flanges, T, applied within the box to prevent the return of the cotton, as set forth.

Fourth, The described construction and arrangement of self-supporting L-shaped doors, C C′, for the purpose explained.

29,342.—J. B. Hay (assignor to Hay & Co.), of Winslow, N. J., for an Improvement in Glass Furnaces:

I claim the three compartments, G G′ and H, with their inclined bases, the partitions, I I, with their openings, a a, near the base, and the inclined side openings, i i, the whole being arranged within the walls of the furnace in respect to the benches, D D, as and for the purpose set forth.

29,343.—Charles Hughes (assignor to himself and Henry Fassman), of New Orleans, La., for an Improved Punching Machine:

I claim the arrangement and combination with the shaft, B, in the manner and for the purpose shown and described, of the adjustable wedge, K, lever, L, wedge, R, lever, U, eccentrics, H H′, arbor, J, wedge, M, dies, N O, punches, P, plate, Q, box, S, and wedge, T, all as set forth.

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29,344.—N. C. Lewis, Jr. (assignor to himself and Edwin Bruce), of Boston, Mass., for an Improvement in Boots and Shoes:

I claim the arrangement and application of separate metallic guards with respect to the main leather outer sole of a shoe, and a gutta-percha or caoutchouc outer sole, substantially in manner as described.

29,345.—Martin Shirk (assignor to himself, S. B. Hartman and Wendel Martzall), of Lancaster county, Pa., for an Improvement in Machines for Dressing Millstones:

I claim the open pick-shaft, A, with its socket, R, adjusting screw, F, peg, E, and spring, S, in combination with the shouldered screw burrs, D1 D2,, on the screw shafts, N1 N2, and their pinions, 5 and 7, operated by means of the pinion, t, on the cam shaft, and pinions, 2 3 and 4, on the elbowed shifting lever, T, substantially as and for the purpose specified.

29,346.—E. D. Wilcox, of Billingham, Mass., assignor to himself and G. D. Nourse, of Cambridgeport, Mass., for an Improvement in Grain Cradles:

I claim the bent rod, h, projecting from the "snath" towards the fingers, C, subbstantially in the manner and for the purpose specified.

RE-ISSUES.

T. B. Bleecker, of New York City, for an Improvement in Folding Bedsteads. Patented April 17, 1847:

I claim, first, The employment of a frame hinged in the center and connected to the two ends of a bedstead for the purpose of folding the whole bedstead together endways, in the manner described.

Second, In combination with said folding frame, I claim the hook-shaped ends to the side rails, taking bolts attached to the posts and forming hinges at these points for folding the hinged frame, or allowing said frame to be disconnected from the posts, as specified.

Third, In combination with said frame ninged to the center, I claim the pendant legs, Fig. 9, and the braces, k, for the purposes and as specified.

G. W. Rains, of Newburgh, N. Y., for an Improved Feed-water Apparatus for Steam Boilers. Patented April 24, 1860:

I claim the combination of the cylinder, A, connected with the boiler, as described, the piston, D, working in the said cylinder, and having an attached valve, whose movements to open and close the communication between the said cylinder and the boiler are effected by the said piston, or its rod, substantially as described, a lifting and disengaging apparatus for lifting and dropping the said piston and valve, and a connection between the piston and a cock or valve in the suction pipe, or its equivalent, the whole operating, substantially as described, to control the supply of water to the boiler.

And in combination with the above-specified apparatus, I claim the alarm cock, V, applied in connection with the piston, to operate substantially as set forth.

[The character of this invention was described in No. 20, Vol. II. (new series), of the SCIENTIFIC AMERICAN.]

ADDITIONAL IMPROVEMENTS.

W. F. Edson, of Philadelphia, Pa., for an Improved Machine for Cutting and Finishing Shoe Heels. Patented Sept. 6, 1859:

I claim the combination of the former, U, the rod, V, plates, W, arms and pins, X, lever, Y, and eccentric, Z, acting substantially as set forth, adjusting the boot or shoe in the machine for shaping, cutting and finishing heels after they are fastened to the shoe.

Anthony Overocker, of McHenry, Ill., for an Improvement in Clover Hullers. Patented July 5, 1859:

I claim constructing the hopper frame substantially in the manner specified, for the purpose of stooping the draft created by the cylinder and returning it to the screens, as is fully set forth.

DESIGN.

W. W. Stanard (assignor to S. S. Jewett and F. B. Root), of Buffalo, N. Y., for a Design for a Cook's Stove.

Notes and Queries

ROBERT SCOTT, of Montreal, C. E., desires to correspond with manufacturers of machinery for making horse-shoe nails and solid-head pins.

F. F., of N. Y.—We believe there is no work on the steam engine such as you want. We know of none better than those you have.

C. I. M., of Mass.—We have no idea that the last object on which the eye of the dying rests can be brought to another's view by the art of the daguerreotypist.

E. S. W., of Ill. —The exhaust steam from a high pressure engine will be sufficiently warm for drying corn.

J. A. T., of Pa.—The discovery is not patentable. If you will send us some of the rock unground, we will tell you what it is.

S. T. Jr., of Mass.—We think Professor Youmans the best popular lecturer on chemistry that we ever heard. Mr. Boynton, though he occasionally lays himself open to criticism, has certainly a most extraordinary faculty for making his lectures on geology both plain and interesting.

B. B., of N. Y.—The bisulphuret of carbon may be made by passing the vapor of sulphur over charcoal ignited in a tube, and receiving the product in a cold bottle.

J. McE., of Tenn.,—As soon as we get a little time we will try to tell you all about the California yeast.

D. K. H., of Vt.—The best time to prune apple trees is while they are growing. However, if the wounds be coated with shellac dissolved in alcohol, the pruning may be done during the winter.

C. B. W., of Pa.—Gunpowder explodes at just 600° Fah., gun-cotton at 270°, if heated quickly; but by heating it very slowly, its temperature may be raised to 356°, and even 392°.

H. L. T., of Wis.—You have doubtless seen full accounts of the comet of which you speak before this time.

MECHANIC, of Mass.—The numerous and careful experiments of Morin entirely settle the point that the friction of journals is not affected by their size, except in the circumstance that the lubricating material is more readily expelled from small than from large axles. You will find the results of Morin's experiments in full on pages 339 and 355 of our last volume.

A READER, of Ala.—A cannon ball is not held up at all by the force of the powder, unless the cannon is pointed somewhat upward when it is fired. If the cannon is perfectly level, the ball falls just as fast as if it were dropped from the muzzle. When a cannon is pointed due east and fired, the velocity imparted by the powder is added to that already derived from the rotation of the earth, and the time occupied by the ball in passing over three miles of the earth's surface is the same as that occupied by the earth in rolling three miles of its surface under the ball, when the latter is projected due west.

E. S. B., of Ga.—It seems to us that your plan for a compensating pendulum is the best and simplest that has ever been invented. Experiment alone, however, could determine the matter.

J. E., of Texas.—The rocks of which you speak were doubtless formed, as you suppose, in the way that most of the rocks on the globe were, by being deposited at the bottom of the sea. As the whole interior of the earth is a molten mass, and as the highest mountains would be represented on a 12-inch globe by two thicknesses of this paper, it requires but a slight wrinkle in the crust of the earth to carry up the bottom of the sea and make it dry land. The shells and specimens which you send belong to the cretaceous or chalk formation.

R. A., of Ohio.—Pale lac or mastic varnish is suitable for transferring printed pictures from paper on wood. The wood receives a coat of varnish first, and before it is quite dry, the picture to be copied is laid on, face to the wood, to which it adheres. When dry, the paper is rubbed off with a little moisture on the finger, and the black lines and colors are found adhering perfectly to the wood.

P. S. P., of Mich.—Pure kaolin clay, dried, then reduced to powder and mixed with boiled linseed oil, makes a good cement for tombstones which are exposed to the weather. Cloth for flags is first prepared with a coating of good boiled size to prevent the paint from running.

MONEY RECEIVED

At the Scientific American Office on account of Patent Office business, for the week ending Saturday, July 28, 1860:—

S. M. S., of Conn., $100; W. R., of Mass., $25; J. C. C., of Conn., $30; E. B., of Ga., $25; C. G., of N. Y., $30; J. D. T., of Mass. $25; O. M. M., of N. Y., $25; W. W., of Cal., $50; W. H., Jr., of N. Y., $25; A. S. L., of Mass., $30; C. T. S., of Cal., $50; S. I. P., of S. C., $25; R. C., of Texas, $100; W. T. O., of Ga., $30; McN. & L., of N. Y., $30; C G of Mich., $25; D. B., of Mich., $25; W. W. & D. B., of Iowa, $30; J. D. A., of Conn., $30; W. S., of Wis., $30; W. C., of N. Y., $50; S. B. D., of N. Y., $250; T. E. C. B., of Ky., $30; J. B. T., of N. Y., $25; J. E. A., of Ill., $10; J. W. K., of N. Y., $130; C. H. D., of Vt., $30; S. P., of Mass., $25; S. P. G., of Wis., $25; C. F., Jr., of Ohio, $25; C. J. F., of N. J., $30; J. A. J., of Ala., $30; E. W. G., of Mass., $40; C. C. G., of Ala., $22; F. M., of Miss., $25; J. J. M., of Conn., $30; M. A. B., of Fla., $25; J. T. P., of Mo., $25; O. D., of Md., $15; C. & Co., of N. Y., $250; J. R., of N. Y., $55; W. W. J., of Va., $30; N. & H., of Pa., $30; A. C., of N. Y., $25; S. H., of Mich., $25; A. A. H., of N. H., $30; C. S., of Mass., $30; L. & K., of Ill. $10; J. S. S., of Ga., $30; W. A. T., of Miss., $25; J. M. H., of Miss., $250; J. H. S., of N. Y., $30; J. W. K., of N. Y., $25; B. & B., of Iowa, $12; B. H. W., of Mo., $25; W. B. H., of Ga., $45; D. A. B., of Ind., $30; E. R. S., of Pa., $10; M. M. C., of N. Y., $25; A. J. G., of Mass., $30; E. J. F., of Mo., $25; M. L. C., of N. Y., $25; F. C. K., of N. J., $25; P. L., of N. Y., $25; W. A. H., of R. I., $250; J. W., of Ohio, $10; J. D., of N. Y., $25; W. C., of Conn., $32; L. H. F., of Pa., $30; A. M. M., of N. Y., $55; J. W., of N. Y., $30.

Specifications, drawings and models belonging to parties with the following initials have been forwarded to the Patent Office during the week ending Saturday, July 28, 1860:—

E. & B., of Ga.; J. G. R., of Maine; J. B. T., of N. Y.; N. F. M., of R. I; W. S. S., of N. J.; E. W. G., of Mass.; F. M., of Miss., A. C., of N. Y.; S. P. G., of Wis.; M. M. C., of N. Y.; T. G. E., of N. Y.; H. K., of N. Y.; R. G. H., of N. Y.; M. A. B., of Fla.; W. H., Jr., of N. Y.; C. C. G., of Ala; J. W. K., of N. Y.; C. F., Jr., of Ohio; J. H. B., of N. Y.; J. H., of Pa.; J. L. B., of N. Y.; S. H., of Mich.; W. R., of Mass., A. M. M., of N. Y.; B. & B., of Iowa; J. H., of Mich.; J. F. W., of La.; S. I. P., of S. C.; W. A. T., of Miss.; J. D. T., of Mass.; J. T. P., of Mo.; W. C., of N. Y. (2 cases); R. M. L., of Minn.; F. C. K., of N. J.; P. D., of R. I.; H. & F., of Pa.; J. K., of Mass.; D. B., of Mich.; E. J. F., of Mo.; O. D., of Md.; P. L., of N. Y.; A. M. M., of N. Y.; C. G., of Mich.; L. H. F., of Pa.; J. D., of N. Y., B. H. W., of Mo.; F. N., of France.

NEW BOOKS AND PERIODICALS RECEIVED.

THE FIGURE OF THE EARTH; by Samuel Elliott Coues, of Washington, D. C. Published by Philp & Solomons, Washington.

We can give the best idea of this work by the following extract.

"THE DISTANCE OF THE SUN AND OF THE MOON FROM THE EARTH.—The difference of longitude between the intersections of the tropics by the magnetic equator (at 19° 47′ angle with the geographic equator), to wit 130°, contains as many times the excess of the equatorial regions as the mean distance of the moon from the earth contains the moon's diameter; and as many times as the mean distance of the sun from the earth contains the sun's diameter. Thus, by the measure of the extent of the terrestrial masses, and the angle of the magnetic equator, the distance of the sun or moon from the earth can be calculated."

HISTORY, THEORY AND PRACTICE OF THE ELECTRIC TELEGRAPH: by George B. Prescott, Superintendent of Electric Telegraph Lines. Published by Ticknor & Fields, Boston.

A very readable and practical work on this subject of universal interest, which we shall more fully notice at an early period.

THE AMERICAN RAILWAY REVIEW. Published by the American Railroad Bureau, No. 28 Exchange-place, New York.

This valuable weekly journal has just commenced its third volume; it furnishes a large amount of reliable reading matter about railroads and all collateral subjects, and also advocates reforms and improvements in an energetic, practical and common-sense manner.

BIBLIOTHECA SACRA. Published by Warren F. Draper, Andover, Mass.

The July number of this learned and philosophical theological review contains a most beautiful essay on the "Missionary Spirit of the Psalms and Prophets," another on the "Deity of Christ," and several on other topics of interest to all men.

RATES OF ADVERTISING.

THIRTY CENTS per line for each and every insertion, payable in advance. To enable all to understand how to calculate the amount they must send when they wish advertisements published, we will explain that ten words average one line. Engravings will not be admitted into our advertising columns: and, as heretofore, the publishers reserve to themselves the right to reject any advertisement sent for publication.

SCIENTIFIC, PRACTICAL AND INTERESTING.—History, Theory and Practice of the Electric Telegraph; by George B. Prescott, of Boston, Superintendent of Electric Telegraph lines. One large volume, with 100 illustrations; price, $1.75. The publishers offer this volume to supply a want, long felt, of a complete manual of the Electric Telegraph. Its author adds to a complete theoretical knowledge of his subject the experience of 18 years as a practical operator and superintendent of Telegraphic lines; and the work itself, while prepared with careful adherence to scientific details, is so far divested of technicalities as to adapt it for use as a popular manual. It affords the most thorough information upon all points connected with the Electric Telegraph. Among its features are:—A description of all the instruments used in Telegraphing in every part of the world, with an engraving of each instrument; a full history of the construction and operation of the Atlantic Telegraph, with a full report of all the messages which passed over the Atlantic Cable; a view of the various uses to which the Telegraph is applied, including an interesting and curious description of the Electric Fire-alarm System, in operation in various cities; and a great amount of information of the highest value to Telegraphic contractors and superintendents, respecting the construction, maintenance and cost of working lines. For sale by all booksellers, or sent, post-paid, to any address by the publishers on receipt of the price. A circular, containing a synopsis of the contents, furnished on application. ☞ Liberal discounts to agents.
1* TICKNOR & FIELDS, Publishers, Boston.

VALUABLE IMPROVEMENT IN PROPELLER Ships—Patented March 27, 1860. For engraving and description, see SCIENTIFIC AMERICAN, Vol. II., No. 23 (June 2, 1860). The use of this patent right may be had, on very liberal terms, by an arrangement with the patentee. Address H. W. HERBERT, Norfolk, Va. 6 4*

INVENTORS' DEPOT AND SALESROOMS FOR Patent Rights, No. 30 Broadway, New York.—Patents possessing positive merits—and such only—have, in this depot, their headquarters, where they can be properly introduced to public notice and find purchasers. Constant opportunities for judicious and profitable investments in patents, embracing all departments in life, can here be found by parties of liberal as well as of limited means. Citizens and strangers, all, can find something to interest and profit them, and they are cordially invited to call at our depot; the latch-string being out. Circulars, descriptive of the objects of the agency, can be had on application. BUTLER, HOSFORD & CO.
6 tf

SOME THREE OR FOUR MECHANICS OR Sawyers, wishing a healthy, well-timbered and never-failing water-power for Sawmills, in a good locality, may address J. B. MUNSY or J. A. McCALLON, Roaring River P. O., Barry county, Mo. 6 2*

TO MANUFACTURERS. — GRAY'S PATENT Let-off Motion, applicable to old and new Looms, and perfectly reliable, is a device by which any desired uniform tension is secured. Satisfaction guaranteed. Address LUTHER ROBINSON, Boston, Mass. 1*

GREAT CURIOSITY.—PARTICULARS SENT free. Agents wanted. SHAW & CLARK,
6 2* Biddeford, Maine.

PHOTOGRAPHY. — COMPLETE FIRST-CLASS outfits, making both ambrotypes and photographs, $30, $45 and $80. Stereoscopic outfits, $35 and $45. Catalogues, one stamp. C. J. FOX, Photographic Warehouse,
6 2* No. 681 Broadway, New York.

$100 PER MONTH MADE BY ANY ACTIVE person with the cheapest and best Stencil Tools in the market. Before purchasing elsewhere, don't fail to send for my latest circular and samples, which are all free. Address—
6 3* D. S. MILLIKEN, Brandon, Vt.

TO MANUFACTURERS AND WHOM IT MAY concern.—We deem Conant's Loom Warp Motion (as represented in the SCIENTIFIC AMERICAN of June 23, 1860) a clear infringement on Letters Patent granted to Snell & Bartlett's additional improvement, dated Sept. 1, 1857. Said patent having been assigned to us, parties building, selling or using the same will take notice, and govern themselves accordingly. E. D. & G. DRAPER.
6 2*

STEAM ENGINES FOR SALE.—ONE OF 8-horse power (superior finish), and Flue Boiler, of 10-horse power, new; also, one second-hand Engine, of 10-horse power. Will be sold very cheap to close a concern. JOHN HOBEN,
1* No. 363 West Twenty-ninth-street, New York.

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RANDALL'S ENGINES. — CIRCULAR SAW-mills are now being built (all complete) for the small sum of $1,700, warranted to cut from 2,000 to 3,000 feet of boards per hour, using the Randall Engine. Also, Engines for Flouring Mills, Factories, &c., at a reduced price, compared with ordinary Engines.
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GREAT BARGAIN.—IRON MACHINE-SHOPS, water power, &c., will be sold at public auction, at the Court House, in the city of Springfield, Clark county, Ohio, on the 11th day of August, 1860, the premises in said city heretofore owned and occupied by Mason & Blakeney, upon which are an extensive iron foundry, large machine-shop, and unfailing water-power from Barnett's hydraulic power, sufficient for two run of burrs, and has done a business of over $100,000 per annum. These premises are situated in a prosperous and growing city, surrounded by the finest agricultural region in the State; numerous other manufacturing establishments on the same hydraulic power, with railroad facilities in all directions, and are offered for sale under an order of court, and at an appraisement so low as to afford to capitalists and persons wishing such property great inducements to purchase. Title unquestionable. For particulars inquire of—
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PORTABLE STEAM ENGINES—6, 8 AND 10-horse, at $500, $625 and $780. For sale by S. C. HILLS, No. 12 Platt-street, New York. 1 e3w

INVENTORS AND PATENTEES DESIROUS OF exhibiting machines and models at the Massachusetts Fair, which opens in Boston on the 12th of September, are informed that we, the undersigned (for a small compensation), will give our personal attention during the Fair to consignments to us for that purpose. Parties who wish us to sell their patents on commission can have them on exhibition, also, previous to and after the Fair, at our salesroom for patents and patented articles, No. 86 Court-street, corner of Howard-street. For extended information, address, with stamp, SPENCE & CO., Boston, Mass. 1*

WOODWORTH PLANING MACHINES FROM $80 to $150.—Sash-molding, tenoning and mortising machines at low prices. For sale at the Philadelphia Machinery Depot, No. 135 North Third-street. [1 13*] CHAS. H. SMITH.

THE MASSACHUSETTS CHARITABLE MEchanic Association respectfully announce to the public their ninth exhibition of American manufactures and mechanic arts, to be opened at Faneuil and Quincy Halls, on Wednesday, the 12th of September, in the city of Boston. Communication from those who wish more particular information, and from those who will require much space, may be addressed to the subscriber.
1 6* JOSEPH L. BATES, Secretary.

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BURNHAM'S IMPROVED JOUVAL TURBINE water wheel (patented Feb. 22, 1859) and mill gearing of the latest improved patterns. Manufactured by N. F. BURNHAM, Variety Iron-works, York, Pa. 1 13*

FOX'S "EXCELSIOR" CRACKER MACHINE—Patented Feb. 1, 1859, can be seen in full operation at his extensive bakery at Lansingburg, N. Y., doing the work of 90 men, with only 10 operatives employed in this large establishment. The machine has also been patented in England, France and Belgium. Territorial rights are offered for sale. For further particulars, please address Ira Jagger, at Albany, N. Y., who is agent for the sale of machines and territorial rights. [25 13] JOSEPH FOX.

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KNITTING MACHINES.—J. B. AIKEN'S power, ribbed and plain knitting machines for factory use; winders, bobbins, &c., furnished at short notice. For pamphlet descriptive of machines, address Aiken Knitting Machine Co., No. 429 Broadway, New York. 22 13

PORTABLE STEAM ENGINES, COMBINING the maximum of efficiency, durability and economy with the minimum of weight and price. They received the large gold medal of the American Institute, at their late fair, as "the best Portable Steam Engine." Descriptive circulars sent on application. Address J. C. HOADLEY, Lawrence, Mass. 1 22*

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No. 61 Main-street, Buffalo, N. Y.
N. B.—Reliable orders filled for any part of the United States and Europe. 1 13

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PORTER'S CENTRIFUGAL GOVERNOR.—THE attention of parties troubled with irregular or unsteady power is respectfully called to this Governor, now coming into general use. It may be used in connection with any valve or cut-off, and will regulate the motion of the engine so perfectly that its entire load may be thrown on or off at once, without sensibly affecting its speed. I will send a Governor to any responsible person for trial; and if its action is not perfect under the above test, it may be returned. Prices exceedingly moderate. All orders and communications will receive prompt attention. Send for a circular.
Address CHAS. T. PORTER, 235 West Thirteenth-street, corner of Ninth-avenue, New York. A few reliable agents wanted.
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GRAY & WOODS' PATENT IMPROVED Planer; a combination of the Woodworth and Daniels' planers, particularly adapted for shop work, and for which we have obtained three patents and six medals. (See description and illustration in No. 6, Volume II., SCIENTIFIC AMERICAN.) Also, for sale, all kinds of wood-working machinery. Send for a circular. Address GRAY & WOODS, No. 69 Sudbury-street, Boston, Mass. 1 tf

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A MESSIEURS LES INVENTEURS—AVIS IMportant.—Les inventeurs non familiers avec la langue Anglaise, et qui préfereraient nous communiquer leurs inventions en Francais, peuvent nous addresser dans leur langue natale. Envoyez nous un dessin et une description concise pour notre examen. Toutes communications seront reçues en confidence.
MUNN & CO., Scientific American Office, No. 37 Park-row, New York.

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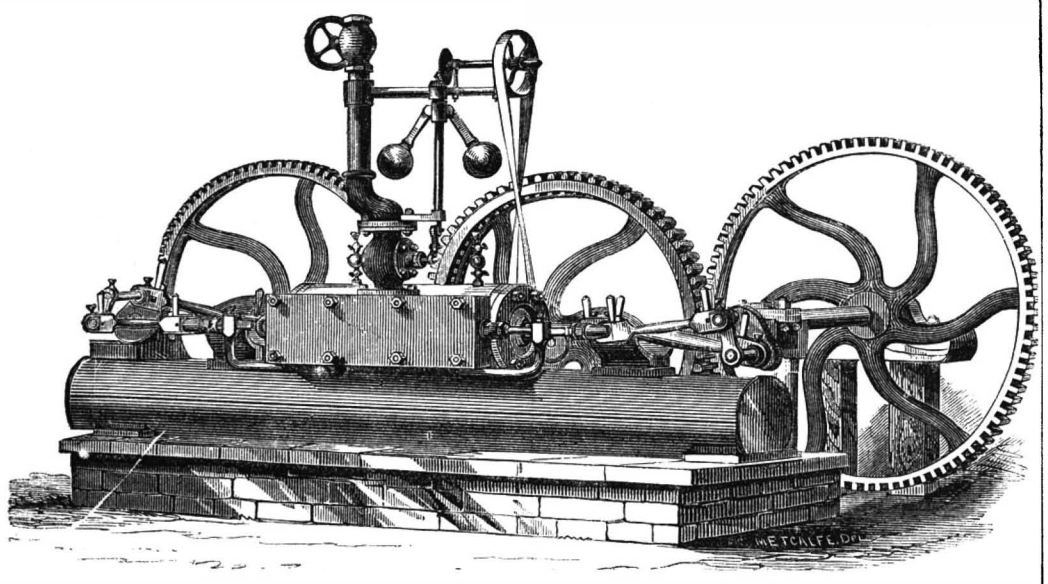
IMPROVED STEAM ENGINE.

The simple but considerable modification in the construction or arrangement of the steam engine illustrated in the accompanying engravings is thus described by the inventor:—

The steam cylinder, A, is constructed with a dividing plate, *l*; thus forming two distinct working cylinders with a piston, *c*, in each, which pistons are connected by piston rods, *d*, and pitmans, *e*, with the cranks, *f f'*, on the axes, *n n'*, which are arranged parallel to each other and supported by suitable bearings, *h h* and *i i*. Each compartment of the cylinder is fitted with ingress and egress passages for the steam, which passages are



RANDALL'S IMPROVED STEAM ENGINE.

opened and closed by valves of any of the known forms for that purpose, operated by suitable gearing.

The steam cylinder, A, and bearings, *h h*, are seated upon, and secured to, a hollow casting, B, which serves the purpose of a bed-plate and heater, through which the exhaust steam passes from the engine to heat the water for the boiler.

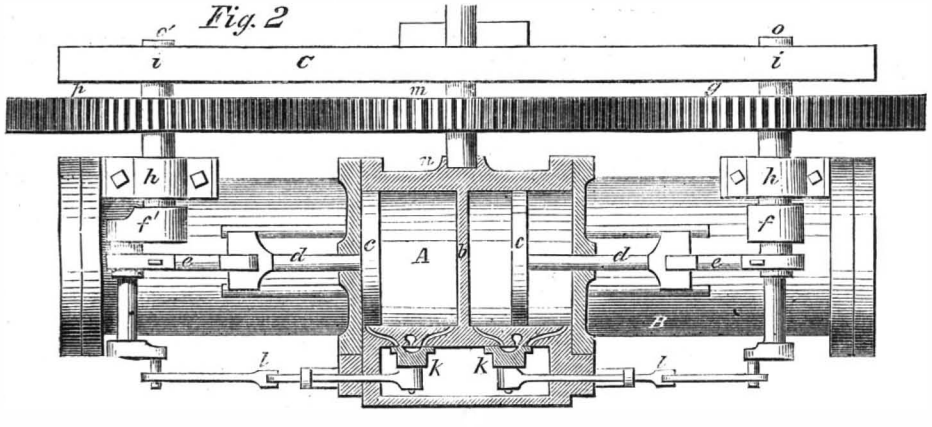
Between the gear wheels, *p* and *g*, is arranged a third, *m*, which meshes into the two driving wheels, and is thus carried by them; being suspended by the teeth and rotated from both sides, maintaining its position almost independently of its bearings, and producing a uniform

The inventor further says:—"There are now in use several of the above engines, ranging from 12 to 100 horse-power; one of the largest running a woolen factory, dispensing with a balance wheel weighing over three tuns, and giving the machinery a perfectly steady motion, so important in carding, spinning and weaving."

The cranks are, of course, set at right angles with each other, so that they will not be both on the dead point at the same time.

This engine was invented by John Randall, who assigned the invention to himself and Reuben R. Smalley, to whom the patent was granted on May 8, 1860; and any further information in relation to the matter may be obtained by addressing R. R. Smalley, at Troy, N. Y. See advertisement in another column.

Fig. 2



and steady motion without the use of the heavy balance wheel usually employed for that purpose.

Pulleys may be used, instead of these gear wheels, if deemed best; in this case, the face of the wheel, *m*, would require to be of sufficient width to allow the belts from each wheel, *p* and *g*, to pass around it.

By this arrangement, the expense of, and space occupied by, a heavy balance wheel and the friction and wear of its journals, are all saved; resulting in a great reduction in the consumption of fuel required to perform a given amount of work. And the economy in first cost, in the space occupied and in the consumption of fuel by making the bed-plate hollow to serve as a heater, giving room for a large amount of pipe, thereby heating the water to a high degree before it enters the boiler, is very great, compared with any other plan of framing such an engine.

AMERICAN ARCHITECTS - ATTENTION!

Men of ingenuity, lend us your ears! There is no greater nuisance in modern houses than that of the transmission of sound through parti-walls. Any practical, inexpensive, and efficient means of deadening sound will be a great boon. Solid walls and solid floors transmit sound in the highest degree. The Metropolitan Building Act provides that all parti-walls shall be solid and of a certain thickness in proportion to hight and length. How is the evil to be overcome? "For eight years," writes a studious friend to us, "I have occupied a house in London; and, during the whole of this time, there have been neighbors having young families. They are musical, and, I must confess, labor most industriously at the scales; morning, noon and night, one or other child howls and strums, apparently without any progress." There is is no objection to neighbors' children learning music and singing—quite the reverse; but it is most objectionable that walls should so readily transmit sound, and render the ladies' efforts so widely known. Some persons take a corner house, so as to be free from such nuisance on one side at least. Is there no remedy? The late Mr. Cubitt had some trouble at Balmoral with certain floors, and remembered in taking down an old palace floor (many years before) vast quantities of cockle shells fell out from between the joists. These had been used in plugging. The idea was acted upon. Cockles were dredged, and brought; the shells were cleaned and dried, and used with beneficial effect. The cellular spaces thus produced absorbed sound. Some highly cellular texture may be applied to walls, ceilings, and floors, which shall resist fire and ordinary decay, allow of finish, and yet deaden sound. Who is to invent and introduce such materials? They may patent the invention and make a fortune, if they will only abate the existing nuisance, and enable us to have solid parti-walls and fireproof floors without being compelled to hear what is going on up stairs and in the next house.

[The foregoing is the language of our deservedly-popular cotemporary, the London *Builder*, in discussing a subject which equally merits the earnest attention of American inventors. We have heard of horse-hair being successfully applied for the above-mentioned purpose, but it is far too expensive for ordinary use. Our architects seem to give themselves very little trouble, when designing public buildings, in making provision for deadening sound.—EDS.

THE TRANSATLANTIC AIR-SHIP.—Preparations are going rapidly on for the departure of Professor Lowe on his aerial expedition across the Atlantic. Subscriptions are being received by Professor Cresson and William Hamilton, of the Franklin Institute, and Lorin Blodget, Esq., Secretary of the Board of Trade, for the purpose of equipping the air-ship with instruments for inflation, and other incidental expenses. It really seems, after the success of the trial trip made a short time ago, that there is nothing to hinder the attempt from being made, and whether fully successful or not, it must add something to the general stock of scientific knowledge; and with the splendid life-boat and many other skillful appliances, it seems that there can be no danger, even if they should descend into the ocean. Professor Lowe states that he will take letters for all parts of Europe, and is fully confident that he can deliver them safely in forty-eight hours. The crew of the *Great Western* is to consist of four persons, viz.: Professor Lowe and two scientific associates, and an experienced sea-captain, to take charge of the boat in case it should be necessary to take to the water.—*Philadelphia North American.*

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To the Inventor and Patentee it is invaluable as the only reliable record of the progress of invention, at home and abroad, and of the weekly issues of American Patents. No person interested in these matters, or who is engaged in mechanical pursuits should think of "getting along" without the weekly visits of this journal. The publishers invite attention to the extraordinarily low price at which it is furnished, making altogether the most valuable as well as the cheapest paper of the kind in the world.

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